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VEGETABLE
MATERIA MEDICA

ILLUSTRATED

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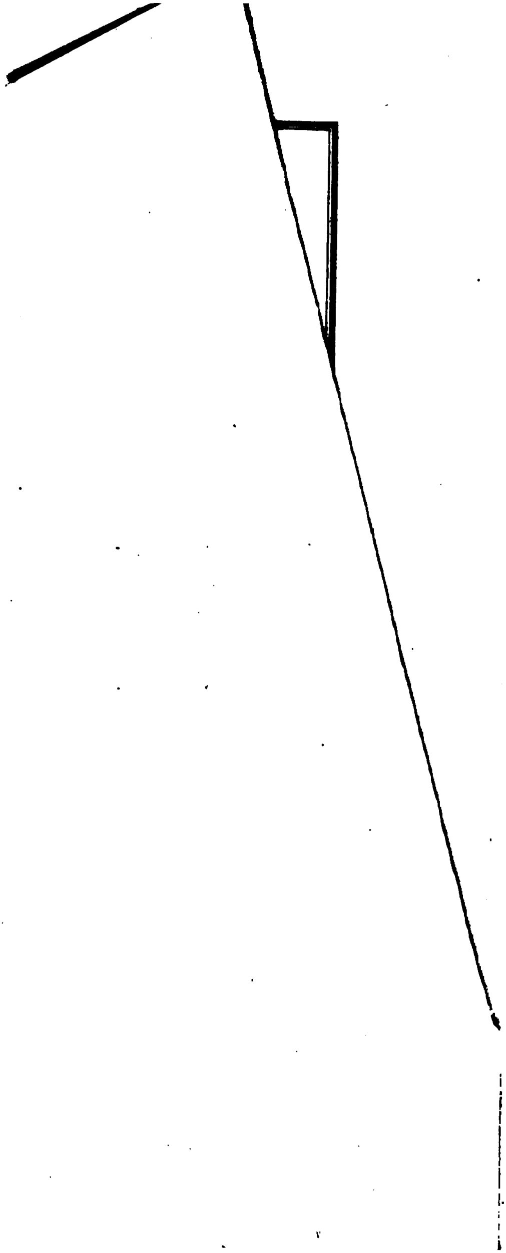

A
MANUAL
OF
VEGETABLE MATERIA MEDICA.

BY

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PREFACE.

THIS manual is intended to supply a want long felt by gentlemen preparing for the various Examinations in Materia Medica; it comprises a thorough description of all the drugs obtained from the vegetable kingdom, and in another book now published (Wills' Elements of Pharmacy) will be found an account of the preparations of these drugs used in medicine. The work is rendered more particularly useful by containing the following specialities:—

1st.—A map of the world, by reference to which the habitat of a drug, and the geographical position of that habitat may be ascertained in a few moments.

2nd.—A tabulated list of the natural orders, with the botanical names of the drugs belonging to the various orders.

3rd.—105 Coloured Illustrations of the most important Barks, Roots, Leaves, Gums, &c., showing their principal characteristics.

4th.—A tabulated list of the different adulterations, and the various drugs so adulterated.

5th.—A tabulated list of the per centages of the active principles contained in the different drugs.

6th.—The different methods for the extraction of the B.P. alkaloids.

7th.—The numbers attached to the names of the drugs refer to the numbered specimens in the Materia Medica Museum at Westminster College, and to the coloured illustrations.

8th.—A collection of 800 questions is inserted, in order to afford an indication of the style and scope of examination in the subject of Materia Medica, after a careful study of which, a candidate is absolutely certain of success in that subject.

THE VEGETABLE
Is divided into

1. Phanerogamia.

Flowering or Cotyledonous Plants, propagated by seeds, having a visible embryo, divided into 2 classes.

1. Endogens or Monocotyledones.

Containing one cotyledon, germination endorhizal, parallel veined leaves, parts of the flower arranged in "threes."

These are divided into 3 sub-classes.

1. Glumaceæ.

Leaves permanent, no petals or calyx, flowers enclosed in bracts called glumes or paleæ.

2. Petaloideæ.

Leaves permanent, perianth verticillate. Sometimes absent.

3. Dictyogenæ.

Leaves reticulated, deciduous floral envelope, verticillate.

2. Exogens or Dicotyledones.

Containing two cotyledons, germination exorhizal, reticulated leaves, parts of the flower arranged in "fours" or "fives."

These are divided into:—

1. Gymnospermia.

Ovules naked or not enclosed in an ovary, and are fertilized directly by the action of the pollen on the ovules.

Example.—Natural order (Coniferæ).

2. Angiospermia.

Ovules enclosed in an ovary, fertilized indirectly by the action of the pollen on the stigma.

This is divided into 4 sub-classes:—

1. Thalamifloræ.

2. Calycifloræ.

3. Corollifloræ

4. Monochlamydeæ.

For description, see next page.

INGDOM
ub-kingdoms.

2. Cryptogamia.

Flowerless or Acotyledonous Plants, propagated by spores instead of seeds, no cotyledons, germination heterorhizal, leaves with furcate venation, divided into 2 sub-classes.

1. Thallogenæ.	2. Acrogenæ.
Which have no distinction between stems and leaves, and have no stomata.	Which have a distinguishable stem, and possess stomata.

---

1. Thalamifloræ.

Calyx and corolla, corolla distinct, petals on thalamus, stamens hypogynous, or adherent to the sides of the ovary.

2. Calycifloræ.

Calyx and corolla, petals distinct, inserted on the calyx, stamens perigynous or epigynous.

3. Corollifloræ.

Usually both sepals and petals, petals united, stamens inserted on the corolla or ovary, or free and arising from the thalamus.

4. Monochlamydeæ.

No petals, sepals only.

Thalamifloræ.	**Calycifloræ.**	**Corollifloræ.**	**Monochlamydeæ.**	**Glumaceæ.**	**Petaloideæ.**	**Dictyogenæ.**
Aurantiaceæ.	Anacardiaceæ.	Atropaceæ.	Aristolochiaceæ.	Graminaceæ.	Iridaceæ.	Smilaceæ.
Byttneriaceæ.	Amyridaceæ.	Asclepiadaceæ.	Cupuliferæ.		Liliaceæ.	
Cruciferæ.	Cucurbitaceæ.	Compositæ.	Cannabinaceæ.		Marantaceæ.	
Canellaceæ.	Leguminosæ.	Cinchonaceæ.	Euphorbiaceæ.		Melanthaceæ.	
Guttiferæ.	Myrtaceæ.	Caprifoliaceæ.	Lauraceæ.		Palmaceæ.	
Malvaceæ.	Rhamnaceæ.	Convolvulaceæ.	Liquidambaraceæ.		Zingiberaceæ.	
Menispermaceæ.	Rosaceæ.	Ericaceæ.	Myristicaceæ.			
Papaveraceæ.	Umbelliferæ.	Gentianaceæ.	Polygonaceæ.	**Gymnospermia.**	**Acrogens.**	**Thallogens.**
Polygalaceæ.		Labiatæ.	Piperaceæ.	Coniferæ.	Filices.	Algæ.
Rutaceæ.		Lobeliaceæ.	Thymelaceæ.			Fungi.
Ranunculaceæ.		Loganiaceæ.	Ulmaceæ.			Lichenes.
Simarubaceæ.		Oleaceæ.				
Zygophyllaceæ.		Styracaceæ.				
		Solanaceæ.				
		Scrophulariaceæ.				
		Valerianaceæ.				

MATERIA MEDICA.

Official and Non-Official Names.	Obtained from.	Natural Order.
Balsamum Peruvianum	Myroxylon Pereiræ	Leguminosæ.
Balsamum Tolutanum	Myroxylon Toluifera	
Bladder Senna	Colutea Arborescens	
Cassiæ Pulpa	Cassia Fistula	
Catechu Nigrum	Acacia Catechu	
Copaiba	Copaifera Multijuga	
Fœnugreek Seeds	Trigonella Fœnum Græcum	
Glycyrrhizæ Radix	Glycyrrhiza Glabra	
Hæmatoxyli lignum	Hæmatoxylum Campechianum	
Indigo	Indigofera Tinctoria	
Kino	Pterocarpus Marsupium	
Physostigmatis Faba	Physostigma Venenosum	
Pterocarpi Lignum	Pterocarpus Santalinus	
Scoparii Cacumina	Sarothamnus Scoparius	
Senna Alexandrina	Cassia { Lanceolata Obovata	
Senna Indica	Cassia Elongata	
	Tephrosia Apollinea	
Tamarindus	Tamarindus Indica	
Tragacantha	Astragalus Verus	
Aconitum	Aconitum Napellus	Ranunculaceæ.
Baneberry	Actæa Spicata	
Podophylli Radix	Podophyllum Peltatum	
Hellebori Nigri Rhizoma	Helleborus Niger	
Stavesacre Seeds	Delphinium Staphysagria	
Aloe Barbadensis	Aloe Vulgaris	Lilliaceæ.
Aloe Socotrina	Aloe Spicata	
Scilla	Urginea Scilla	
Amygdala Amara	Amygdalus Communis	Rosaceæ.
Amygdala dulcis	Amygdalus Communis	
Cusso	Brayera Anthelmintica	
Laurocerasi Folia	Prunus Laurocerasus	
Prunum	Prunus Domestica	
Rosæ Caninæ Fructus	Rosa Canina	
Rosæ Gallicæ Petala	Rosa Gallica	
Rosæ Centifoliæ Petala	Rosa Centifolia	
Wild Cherry Bark	Prunus Virginiana	
Anthemidis Flores	Anthemis Nobilis	Compositæ.
Arnicæ Radix	Arnica Montana	
Lactuca	Lactuca Virosa	
Marigold	Calendula Officinalis	
Ploughman's Spikenard	Inula Conyza	
Pyrethri Radix	Anacyclus Pyrethrum	
Taraxaci Radix	Taraxacum Dens-leonis	
Santonica	Artemisia Cina	
Safflower	Carthamus Tinctorius	

Official and Non-Official Names.	Obtained from	Natural Order.
Armoraciæ Radix	Cochlearia Armoracia	Cruciferæ.
Sinapis	Sinapis Alba Nigra	
Belæ Fructus	Œgle Marmelos	Aurantiaceæ.
Limon	Citrus Limonum	
Aurantii Cortex	Citrus Bigaradia	
Belladonnæ Radix et Folia	Atropa Belladonna	Atropaceæ.
Hyoscyami Folia	Hyoscyami Niger	
Stramonium	Datura Stramonium	
Oleum Anisi	Illicium Anisatum	Magnoliaceæ
Winters Bark	Drymis Winteri	
Areca	Areca Catechu	Palmaceæ.
	Coriaria Myrtifolia	Coriacæ.
Ginseng	Panax Quinque Folium	Araliaceæ.
Benzoinum	Styrax Benzoin	Styraceæ.
Buchu Folia	Barosma Betulina Crenulata Serratifolia	Rutaceæ.
Cuspariæ Cortex	Galipea Cusparia	
Jaborandi	Pilocarpus Pinnatifolia	
Rutæ Herba	Ruta Graveolens	
Cajeputi oleum	Melaleuca Minor	Myrtaceæ.
Caryophyllum	Caryophyllus Aromaticus	
Pimenta	Eugenia Pimenta	
Calumbæ Radix	Jateorhiza Columba Miersii Coscinium Fenestratum	Menispermaceæ.
Pareiræ Radix	Cissampelos Pareira Chondodendron Tomentosum	
Cambogia	Garcinia Morella	Guttiferæ.
Mangosteen Fruit	Garcinia Mangostana	
Bay Berries	Laurus Nobilis	Lauraceæ.
Borneo Camphor	Dryobalanops Camphora	
Camphora	Camphora Officinarum	
Cinnamomi Cortex	Cinnamomum Zeylanicum	
Nectandræ Cortex	Nectandra Rodiæi	
Sassafras Radix	Sassafras Officinale	
Cassia	Cinnamomum Cassia	
Ammoniacum	Dorema Ammoniacum	Umbelliferæ.
Anethi Fructus	Anethum Graveolens	
Anisi Oleum	Pimpinella Anisum	
Assafœtida	Narthex Assafœtida	
Carui Fructus	Carum Carui	
Carrot Fruit	Daucus Carota	
Conii Folia	Conium Maculatum	
Coriandri Fructus	Coriandrum Sativum	
Cumin Fruit	Cuminum Cyminum	
Fœniculi Fructus	Fœniculum Dulce	
Galbanum	Ferula Galbaniflua	
Sumbul Radix	Euryangium Sumbul	

OFFICIAL AND NON-OFFICIAL NAMES.	OBTAINED FROM	NATURAL ORDER.
Cannabis Indica	Cannabis Sativa	Cannabinaceæ.
Lupulus	Humulus Lupulus	
Capsici Fructus	Capsicum Fastigiatum	Solanaceæ.
Dulcamara	Solanum Dulcamara	
Sem Cardamomi	Elettaria Cardamomum	Zingiberaceæ.
Grains of Paradise	Amomum Melequeta	
Turmeric	Curcuma Longa	
Zingiberis Radix	Zingiber Officinale	
Cascarillæ Cortex	Croton Eluteria	Euphorbiaceæ.
Croton	Croton Tiglium	
Euphorbium	Euphorbia Officinarum	
Kamala	Rottlera Tinctoria	
Ricinus	Ricinus Communis	
Catechu Pallidum	Uncaria Gambir	Cinchonaceæ.
Cinchonæ Flavæ	Cinchona Calisaya	
Cinchonæ Pallidæ	Cinchona Condaminea	
Cinchonæ Rubræ	Cinchona Succirubra	
Ipecacuanha	Cephaelis Ipecacuanha	
Comfrey	Symphytum Officinale	Boraginaceæ.
Alkanet	Alkana Tinctoria	
Cacao Butter	Theobroma Cacao	Byttneriaceæ.
Chirata	Ophelia Chirata	Gentianaceæ.
Gentianæ Radix	Gentiana Lutea	
American Calumba	Frasera Walteri	
Colchicum	Colchicum Autumnale	Melanthaceæ.
Veratria	Cevadilla	
Veratri Viridis	Veratrum Viride	
Veratri Albi	Veratrum Album	
Bryony Root	Bryonia Dioica	Cucurbitaceæ.
Colocynthidis Pulpa	Citrullus Colocynthis	
Ecbalii Fructus	Ecbalium Officinarum	
Crocus	Crocus Sativus	Iridaceæ.
Orris Root	Iris Florentina	
Cubeba	Cubeba Officinalis	Piperaceæ.
Maticæ Folia	Artanthe Elongata	
Piper Nigrum	Piper Nigrum	
Piper Longum	Chavica, Roxburghii	
Digitalis Folia	Digitalis Purpurea	Scrophulariaceæ.
Mullein	Verbascum Thapsus	
Bdellium	Balsamodendron Mukul	Amyridaceæ.
Elemi	Canarium, Commune	
Myrrha	Balsamodendron Myrrha	

Official and Non-Official Names.	Obtained from	Natural Order.
Ergota	Secale cereale	Graminaceæ.
Farina Tritici	Triticum Vulgare	
Hordeum Decorticatum	Hordeum Distichon	
Saccharum	Saccharum Officinarum	
Filix-Mas	Aspidium Filix-Mas	Filices.
Galla	Quercus Infectoria	Cupuliferæ.
Quercus Cortex	Quercus Pedunculata	
Granati Radicis Cortex	Punica Granatum	Granatæ or Myrtaceæ
Guaiaci Lignum	Guaiacum Officinale	Zygophyllaceæ.
Guaiaci Resina	Guaiacum Officinale	
Argel Leaves	Solenostemma Argel	Asclepiadaceæ.
Hemidesmi Radix	Hemidesmus Indicus	
Gum Juniper	Callitris Quadrivalis	Coniferæ.
Olibanum	Varieties of Boswellia	
Huile de Cade	Juniperis Oxycedras	
Juniper	Juniperus Communis	
Larch Bark	Larix Europæa	
Pix Burgundica	Abies Excelsa	
Pix Liquida	Pinus Sylvestris	
Resina	Pinus et Abies	
Sabinæ Cacumina	Juniperus Sabina	
Terebinthina Canadensis	Abies Balsamea	
Thus Americanum	Pinus Tæda Palustris	
Krameriæ Radix	Krameria Triandra Krameria Ixina	Krameriaceæ, or Polygalaceæ
Lavandula	Lavandula Vera	Labiatæ.
Mentha Piperita	Mentha Piperita	
Mentha Viridis	Mentha Viridis	
Oleum Menthæ Pulegii	Mentha Pulegium	
Rosmarinus	Rosmarinus Officinalis	
Gutta Percha	Isonandra Gutta	Sapotaceæ.
Cotton Wool	Gossypium	Malvaceæ.
Guarana	Paullinia Sorbilis	Sapindaceæ.
Lini Semina	Linum Usitatissimum	Linaceæ.
Lobelia	Lobelia Inflata	Lobeliaceæ.
Manna	Fraxinus Ornus Rotundifolia	Oleaceæ.
Olivæ Oleum	Olea Europæa	

Thalamifloræ.	**Calycifloræ.**	**Corollifloræ.**	**Monochlamydeæ.**	**Glumaceæ.**	**Petaloideæ.**	**Dictyogenæ.**
Aurantiaceæ.	Anacardiaceæ.	Atropaceæ.	Aristolochiaceæ.	Graminaceæ.	Iridaceæ.	Smilaceæ.
Byttneriaceæ.	Amyridaceæ.	Asclepiadaceæ.	Cupuliferæ.		Liliaceæ.	
Cruciferæ.	Cucurbitaceæ.	Compositæ.	Cannabinaceæ.		Marantaceæ.	
Canellaceæ.	Leguminosæ.	Cinchonaceæ.	Euphorbiaceæ.		Melanthaceæ.	
Guttiferæ.	Myrtaceæ.	Caprifoliaceæ.	Lauraceæ.		Palmaceæ.	
Malvaceæ.	Rhamnaceæ.	Convolvulaceæ.	Liquidambaraceæ.		Zingiberaceæ.	
Menispermaceæ.	Rosaceæ.	Ericaceæ.	Myristicaceæ.			
Papaveraceæ.	Umbelliferæ.	Gentianaceæ.	Polygonaceæ.	**Gymnospermia.**	**Acrogens.**	**Thallogens.**
Polygalaceæ.		Labiatæ.	Piperaceæ.	Coniferæ.	Filices.	Algæ.
Rutaceæ.		Lobeliaceæ.	Thymelaceæ.			Fungi.
Ranunculaceæ.		Loganiaceæ.	Ulmaceæ.			Lichenes.
Simarubaceæ.		Oleaceæ.				
Zygophyllaceæ.		Styracaceæ.				
		Solanaceæ.				
		Scrophulariaceæ.				
		Valerianaceæ.				

SUB-KINGDOM—**Phanerogamia.**

CLASS.—**Dicotyledones.**

SUB-CLASS **I.—Thalamifloræ.**

NATURAL ORDER.—*Ranunculaceæ.*

No. 1. Aconiti Folia. *Aconite Leaves.*

Case **A.**

The fresh leaves and flowering tops of Aconitum Napellus, *Monkshood,* gathered when about one-third of the flowers are expanded, from plants cultivated in Britain. The reason for gathering at this period is that those compounds, which are simply of use as nutrition for the growth of the plant, may be taken up to form new tissues, the secretions necessarily becoming concentrated by their removal.

Habitat Britain, where the plant is cultivated.

The leaves are far less active than the root, and are reported to possess one-sixth of its activity.

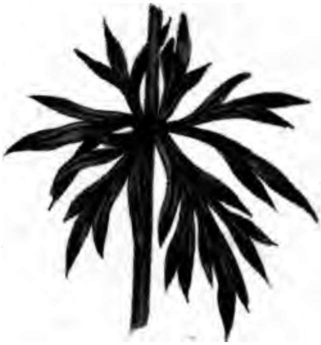
No. 2. Aconiti Radix. *Aconite Root.*

The dried root of Aconitum Napellus, collected in winter or early spring, before the leaves have appeared. The object of the root being collected before the appearance of the leaves is, that in proportion to the growth above ground, so is the loss underground.

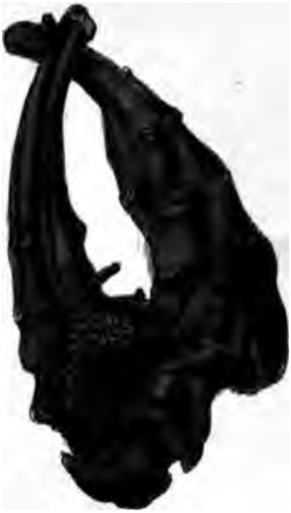
Habitat, cold climates of Europe. Generally imported from Germany or cultivated in Britain.

Characters.—Aconite root is from two to four inches long, coffee coloured, and in shape is conical, tapering to a point. Its taste is acrid, followed by a numbness and tingling of the lips and skin.

Plate 1.



Nº 1.



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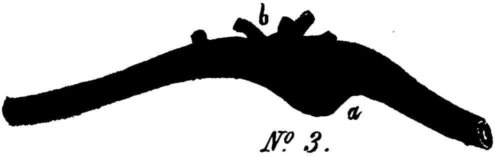

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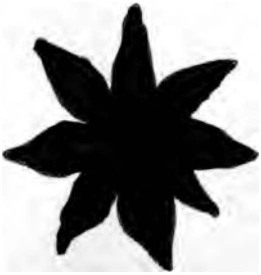

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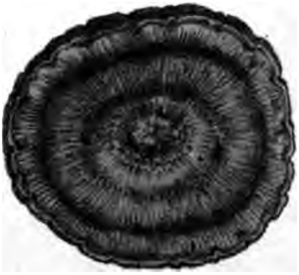


Nº 9

Aconite root has been sometimes mistaken for horseradish root, from which it may be distinguished by the following marked characters :—

Aconite Root	**Horseradish Root**
Is from two to four inches long, conical and terminating in a point, coffee-coloured, possessing no pungent smell, and turns pink when the fresh root is scraped or cut.	Is generally three or four times as long as aconite root, cylindrical, and terminating rather abruptly, of a light yellow colour, possessing a very pungent odour, especially when scraped. It does not turn pink when scraped or cut.

Composition.—All parts of the plant contain the alkaloid Aconitia ($C_{30}H_{47}NO_7$) united with aconitic acid.

Another crystallizable alkaloid named Aconella is present in aconite root, in composition and properties it resembles narcotine. An alkaloid termed Pseudo-aconitia, more powerful in its properties than ordinary aconitia, has been found in the Aconitum Ferox. Aconitia is distinguished from Pseudo-aconitia by the following tests :—

Aconitia softens in boiling water, Pseudo-aconitia does not. Aconitia gives a violet tint with concentrated phosphoric acid, Pseudo-aconitia does not.

Therapeutics.—Aconite is used in nervous complaints, such as neuralgia, gout and rheumatism. It produces numbness of the nerves.

Official Preparations.

Of the leaves.	Extractum Aconiti.
Of the root.	Tinctura Aconiti.
	Linimentum Aconiti.
	Aconitia.
Of Aconitia.	Unguentum Aconitiæ.

No. 3. Podophylli Radix. *Podophyllum Root.*

The dried rhizome of Podophyllum Peltatum or *May Apple.* It is this rhizome which is called mandrake in the United States.

Habitat.—United States of North America.

Characters.—Podophyllum root, as it is called, is known to be a rhizome by its producing buds and leaves on its upper surface, and rootlets from its lower surface. Along the rhizome at intervals more or less flattened and swollen portions are found (*a*), presenting on their upper surfaces a number of rings, produced by the falling off of the leaves, and on their lower surfaces white scars (*b*), due to the detachment of the rootlets. Sometimes the rootlets themselves are found on the rhizome.

Composition.—Podophyllum root contains from 3 to 4 per cent. of resin podophylline. This resin is stated to consist of two resinous bodies, one soluble in ether, the other insoluble; if this is correct, the official resin must contain both, as both are soluble in alcohol. Podophyllum also contains the alkaloid berberine and saponin.

Therapeutics.—The resin contained in podophyllum acts as an active *cathartic.*

Official Preparation.—Podophylli Resina.

No. 4. Hellebori Nigri Rhizoma. *Hellebore Rhizome.*

(Not official.)

The dried rhizome and rootlets of the Helleborus Niger, Black Hellebore, or *Christmas Rose.*

Habitat.—Central Europe.

Adulterations.—Black Hellebore has been frequently adulterated with the rhizome of Actæa Spicata, (*Baneberry*), from which it may be readily distinguished by the following character:—On making a transverse section of a rootlet of Black Hellebore, the meditullium appears as one mass, not being divided in any way.

On treating a rootlet of Baneberry in a similar manner, the meditullium is seen to be divided in a stellate or cruciate manner.

The rhizomes of Helleborus viridis and Helleborus fœtidus are occasionally substituted for Black Hellebore rhizome; this substitution, however, matters little, as they possess as much activity as the true drug.

Therapeutics.—Black Hellebore is a drastic purgative and emmenagogue.

Composition.—An acrid oil, believed to be the active principle, and a crystalline body, Helleborine.

Preparation.—A tincture of Hellebore was formerly official, but the use of the drug has been discontinued, principally on account of its adulteration with the Baneberry, which possesses entirely different properties.

No. 5. Staphysagriæ Semina. *Stavesacre Seeds.*

(Not official.)

The seeds of Delphinium Staphysagria or Stavesacre.

Habitat.—South of Europe.

Characters.—The seeds are of an irregular triangular shape, and possess a deeply pitted testa.

Composition.—Stavesacre seeds contain an alkaloid delphinia ($C_{27} H_{19} NO_7$).

Therapeutics.—Its principal use is externally in the form of an ointment for destroying pediculi.

No. 6. Actæa Racemosæ Rhizoma. *Actæa Rhizome.*

(Not official.)

The dried rhizome and rootlets of Actæa Racemosa, or black snake root. In the United States it is known as Cimicifuga.

Habitat.—United States of North America.

Characters.—The rootlets are considered to be the most active portion; they resemble the rootlets of Actæa Spicata in possessing a stellate meditullium.

Composition.—Cimcifuga contains a resin cincifugin, and a volatile oil. It has not yet been thoroughly analyzed.

NATURAL ORDER.—Magnoliaceæ.

No. 7. Illicium Anisatum. *Star Anise.*

The Star Anise fruit as found in commerce consists of a number of carpals arranged in a stellate manner. Each carpel is generally found with an opening which is its ventral suture, by which it has dehised, and within each carpel is found a single seed.

The oil distilled in China from the fruit of Illicium Anisatum, Star Anise, is official, together with the oil distilled in Europe from the umbelliferous fruit of Pimpinella Anisum, (*Anise.*)

The two oils may be distinguished from one another by the oil from the Illicium Anisatum congealing at a higher temperature than the oil from the Pimpinella Anisum. The Chinese oil is considered as superior to the European oil, and is the one mostly in use in this country.

Therapeutics.—Used as an aromatic and carminative.

Cortex Winteri. *Winter's Bark.*

(Not Official.)

No 8. The bark of Drymis Winteri, or Drymis Aromatica.

Habitat.—The coasts of the Straits of Magellan. Most of the Winter's Bark is not obtained from the true plant, but from the Cinnamodendron Corticosum, a plant of the Natural Order Canellaceæ.

Adulteration.—Canella Alba Bark is often substituted and mistaken for Winter's Bark. They are distinguished from one another by Canella Bark having its outer surface darker than the inner, and by Winter's Bark having its inner surface darker than the outer. An infusion of Winter's Bark will also strike a black colour with salts of iron, from the tannic acid contained in it; an infusion of Canella Bark does not, since it contains no tannic acid.

Composition.—Winter's bark contains a little tannic acid, volatile oil, and resin.

Therapeutics.—Used as an aromatic and tonic.

NATURAL ORDER.—**Menispermaceæ.**

No. 9. Calumbæ Radix. *Calumba Root.*

The root, cut transversely and dried, of Jateorhiza Calumba and Jateorhiza Miersii.

No. 10. Pareira Root.—The dried Root of Chondodendron Tomentosum. It is commonly called *Pareira Brava.*

Habitat.—Brazil.

Characters.—Pareira root was formerly believed to be the produce of Cissampelos Pareira, but Hanbury has clearly shown that its true botanical source is the Chondodendron Tomentosum. It occurs in dark irregular pieces, generally about an inch in diameter and six to twenty-four inches long. When cut it presents a waxy appearance.

Adulterations.—Previous to the discovery of the true source of pareira root, the roots of some allied species were almost entirely found in commerce; all that is known about them is, that they were derived from some menispermaceous plants of unknown origin; that they belong to the menispermaceæ is evident from the peculiar structure of their wood. The true pareira root may be distinguished from this adulteration by the following characters:—

The true pareira root is darkest in colour; it generally possesses only three or four concentric rings of wood, arranged in a very irregular manner, and has a smooth waxy cut.

The substituted root (see No 10a), generally possesses a number of concentric rings arranged in a regular manner, and when cut it presents a rough surface, due to the cells not being in such a compact condition as in the true root.

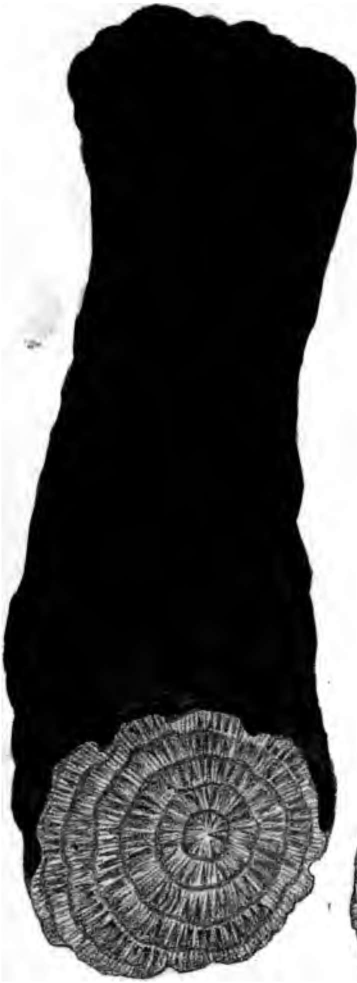
The stems of the chondodendron tomentosum, and of allied species, have been substituted for pareira root.

The root may be distinguished from the stem as follows:—The root is darker and more irregular than the stem; it generally has short rootlets, but it has no perceptible pith nor any development of lichens.

The stem has a pith and an evident development of lichens, but it has no branches.

Composition.—The true pareira root has not been thoroughly analyzed, but the root formerly known in commerce as pareira root contains a bitter principle called *Pelozine* or *Cissampeline* ($C_{18} H_{21} NO_3$), which is believed to be identical with the alkaloid beberia.

Plate 2.



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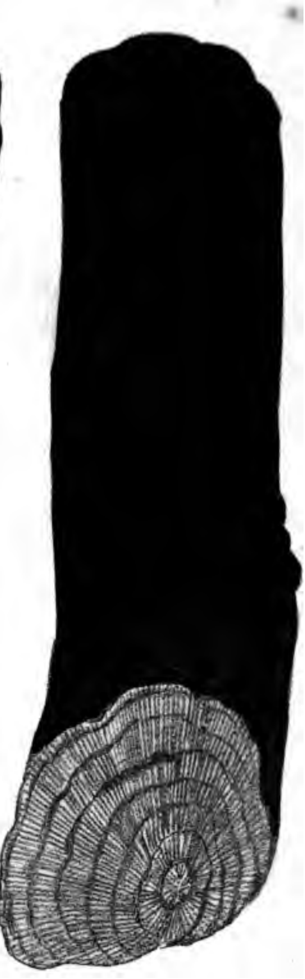


No. 10 A.

Therapeutics.—Pareira root is a tonic and diuretic.

Official Preparations.

Decoctum Pareiræ.
Extractum Pareiræ.
Extractum Pareiræ Liquidum.

No. 11. Cocculus. *Cocculus Indicus.*

The dried fruit of Anamirta Cocculus or Anamirta Peni- lata. It is commonly but incorrectly called a berry; is a drupe.

Habitat—India.

Characters.—The Cocculus Indicus fruit is reniform or idney shape, enclosing one seed, which is firmly attached the placenta to the pericarp. If the fruit is good, this ed should fill at least two-thirds of the shell.

Cocculus Indicus fruits are frequently confounded with y berries. They may be distinguished as follows .—

Cocculus Indicus.	**Bay Berries.**
Kidney shaped.	1. Oval in shape, larger than Cocculus Indicus.
The seed does not rattle when the fruit is shaken, being firmly attached to the placenta.	2. The seed rattles when a berry is shaken, because it lies loose in the pericarp.

Contains a crystalline neutral principle Picrotoxine, found ly in the seed, to which its activity is due. The pericarp ntains two alkaloids, menispermia and paramenispermia, th of the same composition, they are distinguished from e another by the former combining with acid to form lts, and the latter not doing so.

Therapeutics.—Cocculus Indicus has been used externally the form of an ointment, to destroy pediculi. It is quently used to adulterate beer, in order to increase its toxicating power. It is also used by poachers for upifying fish and game.

NATURAL ORDER.—*Papaveraceæ.*

No. 12. Rhœados Petala. *Red Poppy Petals.*

The fresh petals of Papaver Rhæas, the red or corn poppy. The fresh petals only should be used in making the syrup, and they should be collected on a hot, dry day.

Habitat.—Indigenous.

Composition.—Red poppy petals contain a red colouring matter, for which they are chiefly used in medicine. They contain no morphia.

Official Preparation.—Syrupus Rhœados.

No. 13. Papaveris Capsulæ. *Poppy Capsules.*

The nearly ripe dried capsules of Papaver Somniferum, the opium poppy.

Habitat.—Asia and Egypt, it is also largely cultivated in Britain.

Characters.—There are two well marked varieties of the Papaver Somniferum, *viz.* :—

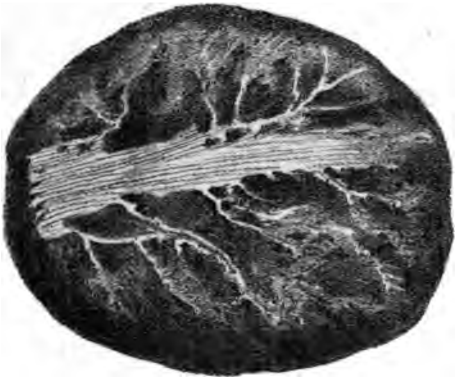
1 **Papaver Somniferum—*var* Nigrum.**	2. **Papaver Somniferum—*var* Album.**
Petals usually red, capsule dehiscing by pores, situated under the stigma, seeds dark coloured. These seeds are commonly called *maw seeds.*	Petals white. Capsules indehiscent. Seeds white.

Poppy capsules are most active before they are quite ripe, and should be gathered at that period. On the top of each capsule is a star like sessile stigma. Within, the seeds are attached to parietal placentas, which project into the cavity of the ovary, and which are equal in number to the stigmas.

Composition.—Poppy Capsules contain a small amount of the principles found in opium ; from the seeds a fixed oil, called poppy-oil, is obtained by expression.

Plate 3.

No. 15



No. 16

No. 14. Opium. *Opium.*

The juice obtained by incision from the unripe capsules of Papaver Somniferum, and hardened by spontaneous evaporation.

Habitat.—Asia Minor; cultivated also in Egypt, Persia, and India.

Collection.—Opium is obtained by making incisions into the poppy capsules a few days after the petals have fallen, the incisions are made either horizontally or vertically; either way does, as the laticiferous vessels in which the juice is contained permeate in every direction. In Asia Minor and Smyrna the incisions are made horizontally, and extend about three-fourths round the capsule. In India the incisions are made vertically. Care must be taken that the incision does not go through the pericarp, as this would cause most of the milky juice to flow into the inside and to be lost, and would also prevent the ripening of the seeds, which alone will pay the cost of the cultivation of the poppy, on account of the oil obtained from them. The exuded juice, which is at first of a white colour soon becomes brown and concretes in the form of tears, which are then scraped off and either worked up into a mass or the separate tears are simply put together. The opium is further dried in the shade and the masses are usually enveloped with some leaf.

Characters.—Several varieties of opium are found in commerce, as Smyrna, Constantinople, Egyptian, Persian or Trebizond, Indian and European. Of these the first four only are found in English commerce; the Smyrna and Constantinople opiums are the only official ones; the other opiums should not be employed in making the preparations of the Pharmacopœia.

No. 15. Smyrna Opium, commonly called Turkey or Levant opium, occurs in masses, made up of agglutinated tears, weighing from half to two pounds. These masses are wrapped up in poppy leaves, which possess marked pinnate or feather venation, and are generally covered externally by the capsules of a species of *Rumex;* instead of the capsules their triangular seeds are frequently found on the masses of opium, on account of their pericarps having been rubbed or shaken off. This is the best kind of opium, it contains on the average about 8 per cent. of morphia.

No. 16. Constantinople Opium occurs either in large cakes or in small lenticular masses, weighing from a quarter to half a pound. The masses are generally wrapped in a poppy leaf, with a marked midrib, and are never covered with rumex capsules, by which character this kind of opium may be distinguished from Smyrna opium. Constantinople opium is generally considered to be inferior to Smyrna; some specimens, however, contain a large per centage of morphia.

No. 17. Egyptian Opium occurs in circular cakes, more or less flat, about two or three inches in diameter, and covered with a leaf which is believed to be that of the Oriental Plane. This leaf can be distinguished from the poppy leaf by possessing palmate or radiate venation. Internally this opium is of a reddish colour, which does not darken by keeping, as the other kinds of opium do. It is inferior to either the Smyrna or Constantinople opium.

No. 18. Persian or Trebizond Opium originally came over in sticks wrapped up in paper, about the thickness of the little finger and about six inches in length. This opium is very inferior. Recently opium of a better quality has been imported from Persia in lumps, some specimens of which, forwarded to the author, contained from 8 to 9 per cent. of morphia.

No. 19. East Indian Opium, called *Chinese investment opium,* occurs in round balls like cannon balls. It turns black by keeping, and is a very inferior variety.

European Opiums, amongst which are English, French, and German, are occasionally met with, but are, as a rule, very inferior varieties.

Adulterations.—Inferior kinds of opium, and opium from which the morphia has been extracted, have been substituted for good opium. Impurities such as stones, gravel,

bullets, &c., have frequently been found mixed with opium. Opium of too soft a consistence should not be used, as the more water there is in a sample, the smaller the per centage of morphia will be.

The best way to ascertain the purity of a sample of opium is to estimate the amount of morphia present in it. The following is the test given in the British Pharmacopœia for estimating the amount of morphia present in opium :—

Take of opium one hundred grains, slaked lime one hundred grains, distilled water four ounces. Break down the opium, and steep it in an ounce of the water for twenty-four hours, stirring the mixture frequently. Transfer it to a displacement apparatus, and pour on the remainder of the water in successive portions, so as to exhaust the opium by percolation. To the infusion thus obtained, placed in a flask, add the lime, boil for ten minutes, place the undissolved matter on a filter and wash it with an ounce of boiling water. Acidulate the filtered fluid slightly with diluted hydrochloric acid, evaporate it to the bulk of half an ounce, and let it cool. Neutralize cautiously with solution of ammonia, carefully avoiding an excess ; remove by filtration the brown matter which separates, wash it with an ounce of hot water, mix the washings with the filtrate, concentrate the whole to the bulk of half an ounce, and add now solution of ammonia in slight excess. After twenty-four hours collect the precipitated morphia on a weighed filter, wash it with cold water, and dry it at 212°. It ought to weigh at least from six to eight grains.

Composition.—Opium contains a peculiar acid and several alkaloids and neutral bodies, of which the following are the most important, Meconic Acid, Morphia, Codeia, Thebaia or paramorphia, Narcotine, Narcein, Meconin, a trace of volatile oil, resinous and extractive matter.

Meconic acid ($C_7 H_4 O_7 3 H_2 O$), a tribasic acid. It is best prepared by adding hydrochloric acid to a hot solution of meconate of calcium ; the meconic acid crystallizes out on cooling. Meconic acid gives a blood red colour with neutral ferric salts, which colour can be distinguished from the similar one of ferric sulphocyanide by being destroyed by hydrochloric acid. The colour of ferric sulphocyanide is not destroyed on the addition of hydrochloric acid.

Morphia ($C_{17}H_{19}NO_3$), an alkaloid existing in opium in combination with meconic acid. Soluble in alcohol, but only very slightly so in water. It has an alkaline reaction both on turmeric and red litmus paper. Morphia liberates iodine from iodic acid, and strikes a blue colour with neutral ferric salts.

Codeia ($C_{18}H_{21}NO_3$), a white crystalline alkaloid, distinguished from morphia by not giving a blue colour with ferric salts.

Thebaia or Paramorphia ($C_{19}H_{21}NO_3$), a white crystalline alkaloid, distinguished from morphia by not becoming blue on the addition of a ferric salt, and from codeia by not forming crystallizable salts. The name *paramorphia* was given to it by Pelletier, who believed it to be isomeric with morphia.

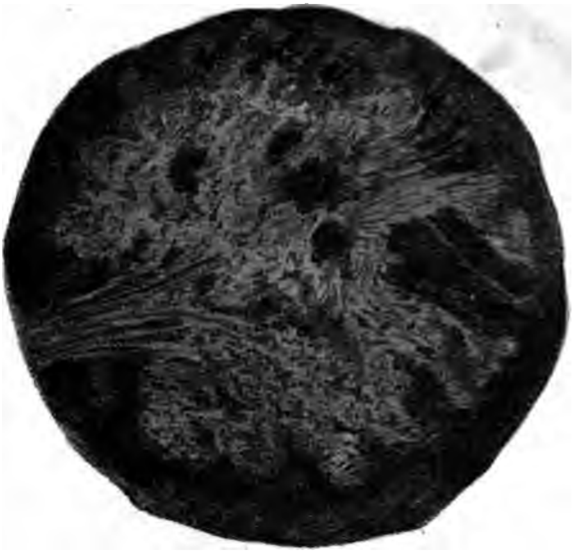
Narcotine ($C_{22}H_{23}NO_7$), a neutral principle existing in opium in the free state. After exhausting opium with water the narcotine is left in the residue, from which it may be extracted with ether. It can be distinguished from morphia, codeia, and thebaia by giving no alkaline reaction with test paper. It does not possess narcotic properties as its name seems to imply; its solution in sulphuric acid has been used with success in India as a substitute for sulphate of quinine.

Narcein ($C_{23}H_{29}NO_9$), a white crystalline solid, distinguished from the other bodies present in opium by giving a light-blue colour with dilute sulphuric, nitric, or hydrochloric acids.

Meconin ($C_{10}H_{10}O_4$), a white crystalline solid, containing no nitrogen.

Therapeutics.—Opium, when taken internally, generally produces at first a stimulating effect on the vascular and nervous systems, afterwards producing sleep. In large doses it is a poison, the sleep passing into a condition of coma, followed by death.

Plate 4.



No 17

No 18

Official Preparations.

Of Opium—

- Confectio Opii
- Emplastrum Opii.
- Enema Opii.
- Extractum Opii
- Extractum Opii Liquidum
- Linimentum Opii
- Pilula Saponis Composita
- Pilula Plumbi cum Opio
- Pulvis Cretæ Aromaticus cum Opio
- Pulvis Ipecacuanhæ Compositus
- Pulvis Kino Compositus
- Pulvis Opii Compositus
- Tinctura Opii.
- Tinctura Camphoræ Composita
- Tinctura Opii Ammoniata
- Trochisci Opii
- Unguentum Gallæ cum Opio
- Vinum Opii
- Morphiæ Hydrochloras.

Of Hydrochlorate of Morphia—

- Liquor Morphiæ Hydrochloratis
- Suppositoria Morphiæ
- Trochisci Morphiæ.
- Trochisci Morphiæ et Ipecacuanhæ
- Morphiæ Acetas

Of Acetate of Morphia—

- Liquor Morphiæ Acetatis.

NATURAL ORDER.—*Cruciferæ.*

No. 20. Sinapis. *Mustard.*

The seeds of Sinapis Nigra and Sinapis Alba, or black and white mustard, reduced to powder, mixed.

Habitat.—Indigenous; growing in waste places and cultivated in fields.

Characters.—Black mustard seeds are very small, round, of a brownish black colour externally; internally they possess a yellow nucleus. They possess no odour, but when rubbed with water they give a very pungent smell, due to the formation of volatile oil.

White mustard seeds are larger than those of the black mustard. They are of a yellow colour both externally and internally. They possess no pungent odour even when rubbed with water. Flour of mustard consists of the seeds of both black and white mustard crushed, pounded, and afterwards sifted once or twice.

The two plants may be distinguished by the following characters:—White mustard has hispid spreading siliques, which are short and are surmounted by a long beak, and generally curved. Black mustard has smooth siliques, adpressed to the stem, with short straight beak.

Adulterations.—Flour of Mustard is frequently adulterated with flour or starch. A cold decoction of mustard should not become blue on the addition of tincture of iodine, indicating the absence of starch.

Composition.—Black mustard seeds contain a fixed oil, Myronate of potash, Myrosin, and a crystallizable substance called Sinapisin. They do not contain any volatile oil ready formed, but in presence of water the Myrosin decomposes the Myronate of potash, and the volatile oil is one of the products of this decomposition. The water used may be warm, but if it is raised to a temperature of 212° F. no volatile oil is formed, on account of the heat coagulating the Myrosin, in which state it is incapable of effecting the decomposition of the Myronate of potash. Volatile oil of mustard (C_3H_5CNS) is the Sulphocyanide of Allyl, it is of a pale yellow colour and possesses an extremely pungent odour.

White mustard seeds contain a fixed oil, similar to that present in the black mustard seeds, an oily principle to which the acrid taste of the seeds is due, and Myrosin, but they contain no Myronate of potash, and therefore when mixed with water they yield no volatile oil. They also differ from black mustard seeds in containing a principle called Sulphocyanide of Sinapin.

Black mustard seeds do not contain sufficient Myrosin to decompose all the Myronate of potash, therefore in flour of mustard the Myrosin of the white mustard seeds effects the decomposition of the remainder.

Therapeutics.—Mustard acts as a powerful stimulant, diuretic, and in large doses it possesses emetic properties.

Official Preparations.

Of the Seeds	Cataplasma Sinapis Oleum Sinapis
Of the volatile oil	Linimentum Sinapis Compositum.

No. 21. Armoraciæ Radix.

Horseradish Root.

The fresh root of Cochlearia Armoracia.

Habitat.—Cultivated in Britain and all parts of Europe.

Characters.—Horseradish root is long, cylindrical, of a very light yellow colour externally, and of a white colour within. When cut or scraped it emits a very pungent odour.

Composition.—Horseradish root contains Myrosin, Myronate of potash, and water; hence, on scraping the root, the volatile oil is produced by the Myrosin and Myronate of Potash reacting on each other in presence of the water contained in it. The volatile oil was believed to be identical with volatile oil of mustard, but, according to Hofmann, it is the Sulphocyanide of Butyl ($C_4 H_9 CNS$); that the volatile oil does not exist ready formed in the root may be proved by treating with alcohol, when no volatile oil is extracted.

Therapeutics.—The same as mustard.

Official Preparation.

Spiritus Armoraciæ Compositus.

NATURAL ORDER.—*Violaceæ.*

(Not Official.)

No. 22. Violæ. *Violets.*

The fresh flowers of Viola Odorata, the sweet violet. They should be gathered soon after the expansion of the flower.

Composition.—Violet petals contain a colouring matter, volatile oil, and a small quantity of an acrid principle called Violin. The colouring matter is turned red by acids and green by alkalies.

Therapeutics.—Slightly laxative. The root, in doses of from 30 to 60 grains, possesses emetic and purgative properties.

Preparation.—Syrupus Violæ.

NATURAL ORDER.—*Polygalaceæ.*

No. 23. Senegæ Radix. *Senega Root.*

The dried root of Polygala Senega.

Habitat.—United States of America.

Characters.—Senega root consists of twisted portions, about the thickness of a quill, attached to a knotty root stock. Each portion has a projecting ridge in the form of a keel, extending throughout its entire length. The activity resides entirely in the cortical portion, the meditullium or inner portion being inert.

Adulterations.—Ginsing root obtained from Panax Quinquefolium is occasionally used to adulterate senega root. It is distinguished by the absence of the projecting ridge, its spindle shape, and by being much larger than senega root. The roots of species of Gillenia have also been found mixed with senega. They are detected by the absence of the projecting ridge.

Composition.—Senega contains a principle called Polygalic acid or Senegin, to which it is said to owe its active properties, it also contains tannic acid, Pectin and Saponin: to the latter is due the frothing of an infusion of Senega.

Therapeutics.—Senega root possesses diaphoretic, diuretic and expectorant properties.

Official Preparations.
Infusum Senegæ
Tinctura Senegæ.

No. 24. Krameriæ Radix. *Rhatany Root*

The dried root of Krameria Triandra, commonly known as Peruvian Rhatany.

Habitat.—Peru.

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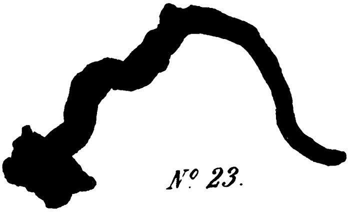
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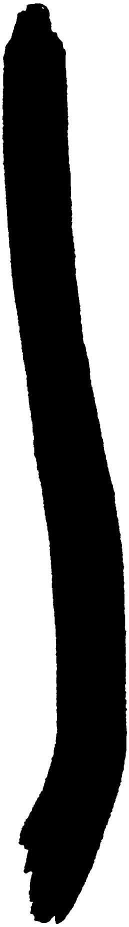
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No. 24 a.

Characters.—Long roots of a reddish brown colour, sometimes attached to a thickened rootstock. The root consists of an easily separable bark or cortical portion, and the meditullium or inner portion.

The activity resides almost entirely in the bark. Small pieces are therefore the best, as they contain a greater proportion of bark.

Adulterations.—A Rhatany called Savanilla, or New Granada Rhatany, is frequently found in commerce. This may be distinguished from the official rhatany by its violet colour, by the bark being firmly attached to the wood, and therefore not easily removed, and by deep cracks extending across the root. This Savanilla rhatany is quite as good and in some cases superior to the official rhatany; its botanical origin is Krameria Ixina. Another variety termed Para rhatany is sometimes found in commerce, it can be bent to and fro without breaking, whereas the Peruvian rhatany would snap.

Composition.—Rhatany root contains 40 per cent. of tannic acid, to which its astringent properties are due, it also contains Krameric acid, of which little is known.

Therapeutics.—A powerful astringent.

Official Preparations.
Extractum Krameriæ.
Infusum Krameriæ.
Pulvis Catechu Compositus.
Tinctura Krameriæ.

NATURAL ORDER.—*Linaceæ.*

No. 25. Lini Semina. *Linseed.*

The seeds of Linum Usitatissimum, *the common flax.*

Habitat.—Britain.

Characters.—The seeds are small, flattened, and shining on the surface, of a brown colour externally, and a yellowish white internally.

Flax is prepared from the liber or inner bark of this plant.

Tow consists of the short threads separated during the combing of flax.

Linen is made from flax, and *lint* is linen the surface of which has been scraped.

Adulterations.—Small seeds obtained from some cruciferous and other plants have frequently been mixed with linseed. Attention to the above-mentioned characters will distinguish them.

Composition.—Linseed contains from 22 to 27 per cent. of a fixed oil found in the kernel, and mucilage which resides in the coats of the seeds.

Therapeutics.—An emollient and demulcent.

Official Preparation.—Infusum Lini.

NATURAL ORDER.—*Malvaceæ.*

No. 26. Gossypium. *Cotton Wool.*

The hairs of the seeds of Gossypium Herbaceum and other species of Gossypium, carded.

Characters.—Cotton consists of tubular hairs, becoming flattened by drying, which were attached to the surface of the seed.

Cotton is composed of *cellular* tissue, the cells being placed end to end. By drying, these cells become angular. Linen is composed of *vascular* tissue, the vessels being round, tapering at their extremities and overlapping one another. It is on account of its fibres being smooth and devoid of angles, that linen is preferable to cotton for dressing wounds.

Composition.—Cotton is of the same composition as lignin, or ordinary woody fibre ($C_6 H_{10} O_5$).

Official Preparation.—Pyroxylin.

(Not official.)

No. 27. Althææ Radix. *Marsh Mallow Root.*

The dried root of Althææ Officinalis. It should be gathered from plants two years old, as it contains most mucilage and very little fibrous portion then.

Habitat.—Indigenous; common throughout Europe.

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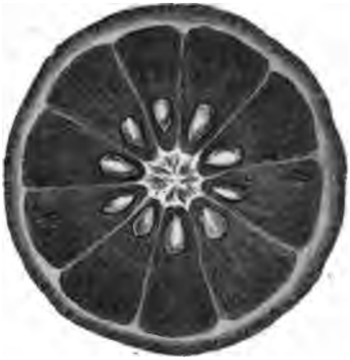
Nº 29.

Nº 29. Section.



Nº 30. Section.

Characters.—The root is of a yellow colour externally, and white within. It frequently has the epidermis removed, when it is white on the outside.

Composition.—Mucilage, starch, and althein.

Therapeutics.—A demulcent.

NATURAL ORDER.—*Byttneriaceæ.*

No. 28. Oleum Theobromæ. *Oil of Theobroma.*

Oil of Theobroma, or Cacao Butter, is a concrete oil obtained by expression and heat from the ground seeds of Theobroma Cacao.

Habitat.—West Indies and South America.

Description.—The heat used in the extraction of Oil of Theobroma is to melt the concrete oil; if not previously melted it could not be expressed from the seeds. Cocoa and chocolate simply consist of these seeds roasted, divested of their integuments, then ground and mixed with sugar, starch, and frequently some flavouring matter.

Prepared cocoa consists of the seeds from which the oil has been expressed.

An advantage possessed by Oil of Theobroma is that it does not become rancid from exposure to the air.

Composition of the seeds.—Cocoa seeds contain an alkaloid much resembling theine, which is found in tea, and about 50 per cent. of oil of Theobroma.

Official Preparations.

The oil is used in the suppositories of the British Pharmacopœia.

NATURAL ORDER.—*Sapindaceæ.*

No. 29. Guarana.

(Not Official.).

The seeds of Paullinia Sorbilis, Brazilian Cocoa.

Habitat.—Brazil.

Characters.—Guarana consists of the seeds dried, crushed, and made into a mass with water, which is then generally rolled out in the form of long sausages, about twelve inches long and one or two inches thick. An infusion, made in the same way as tea, is the usual form of administering this drug.

Composition.—Contains 5 per cent. of an alkaloid called guaranine, similar to theine, the alkaloid contained in tea.

NATURAL ORDER.—*Aurantiaceæ.*

No. 30. Aurantii Cortex. *Bitter Orange Peel.*

The dried outer portion of the rind of the fruit of Citrus Bigaradia, the Seville or bitter orange.

Habitat.—South of Europe.

Characters.—Orange peel should be deprived of the inner white portion, which is useless. The rind is covered with numerous dots, which are the glands containing the volatile oil and bitter extractive, termed hesperidin.

Therapeutics.—The rind is a stomachic and tonic.

Official Preparations.

Infusum Aurantii.
Infusum Aurantii Compositum.
Tinctura Aurantii.
Syrupus Aurantii.
Vinum Aurantii.

Aqua Aurantii Floris. *Orange Flower Water.*

The water distilled from the flowers of Citrus Bigaradia, the bitter orange tree, and Citrus Aurantium, the sweet orange tree. Prepared mostly in France.

Preparation and Adulterations. See Elements of Pharmacy.

Official Preparation. Syrupus Aurantii Floris.

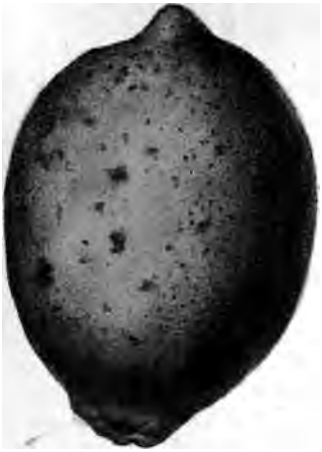
No. 31. Limonis Cortex. *Lemon Peel.*

The outer part of the rind of the fresh fruit of Citrus Limonum, the lemon tree.

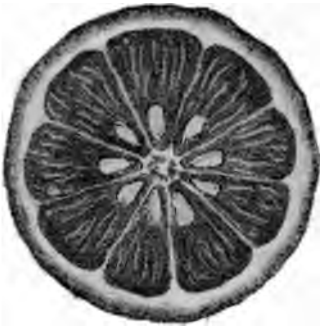
Habitat.—Southern Europe

Characters.—Lemon peel occurs in thin yellow slices,

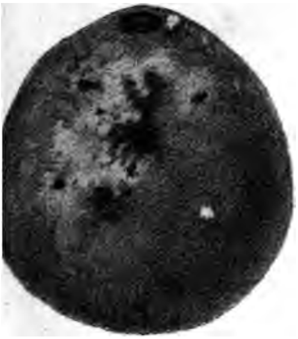
Plate 7.



Nº 31



Nº 31. Section.



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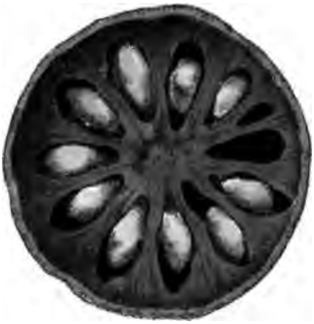

Nº 32. Section.

tted with the glands containing the oil. The inner white rtion should be removed, as it is inert. The fresh peel ly is official.

Composition.—Lemon peel contains volatile oil and bitter tractive.

Therapeutics.—A stomachic; also used as a flavouring ent.

Official Preparations.

Oleum Limonis.
Syrupus Limonis.
Tinctura Limonis.

Limonis Succus. *Lemon Juice.*

The freshly expressed juice of the ripe fruit of Citrus nonum.

Official Preparation.—Acidum Citricum.

No. 32. Belæ Fructus. *Bael Fruit.*

The dried half-ripe fruit of Ægle Marmelos.

Habitat—Malabar and Coromandel (the coasts of India).

Characters.—The fruit is round, about the size of a large nge, with a hard woody rind. It is imported in fragnts consisting of rind, with dried pulp and seeds adent to it. The epicarp or outer portion of the rind is nly attached. The fruit is a hesperidium.

Adulteration.—The dried rind of the Mangosteen fruit been found mixed with Bael fruit. It may be disguished from Bael fruit by having no adhering pulp or ds, by the epicarp being easily detached and by the ces which come from the top of the fruit possessing iating stigmas.

Composition.—No true analysis has yet been made.

Therapeutics.—An astringent.

Official Preparation. Extractum Belæ Liquidum.

NATURAL ORDER. *Canellaceæ.*

No. 33. Canellæ Albæ Cortex. *Canella Alba Bark.*

Habitat.—The West Indies.

Characters.—The bark occurs in quills, produced by its curling during the process of drying. It is called spurious Winter's bark, on account of its having been substituted for Winter's bark. (For the distinguishing characters, see Winter's bark.)

Composition.—A volatile oil, resin, and bitter extractive.

Therapeutics.—An aromatic tonic.

Official Preparation.

One of the ingredients of Vinum Rhei.

The powder called Hiera Picra (not official) consists of aloes and powdered Canella bark.

NATURAL ORDER.—*Guttiferæ.*

No. 34. Cambogia. *Gamboge.*

A gum resin obtained from the leaves and twigs of Garcinia Morella, *var* pedicellata.

Habitat.—Siam.

Characters.—Gamboge occurs in cylindrical pieces, called pipe or roll gamboge, and also in lumps. It is obtained by breaking off the leaves and twigs, when the gamboge exudes as a yellow milky juice. The pipe gamboge is obtained by collecting this juice in bamboo stems. Pip gamboge, which is generally the best on account of th difficulty of mixing adulterations with it, is striated ex ternally, an impression which it has received from th uneven interior of the bamboo stem in which it was co lected. It should be brittle, and the fractured surfa should be smooth and shining. If pure, it should entirely dissolved by successive treatment with ether a water, the ether dissolving the resin and the water the gu

Adulteration.—Starch. A cold decoction of gambo should not become green on the addition of solution iodine; if a green colour is produced, it is due to mixture of the blue colour of the iodide of starch with yellow colour of the gamboge.

Composition.—Good gamboge contains about 75 per of a resin called gambogic acid, and about 25 per ce gum; if rubbed with water, the gum dissolves and the remains suspended in the solution, forming a yellow emu

Therapeutics.—A drastic purgative; in large doses it is poisonous.

Official Preparation.—Pilula Cambogiæ Composita.

NATURAL ORDER. *Vitaceæ.*

No. 35. Uvæ. *Raisins.*

The ripe fruit of Vitis Vinifera, the grape vine, dried in the sun or with artificial heat.

Habitat.—Spain.

Composition.—Raisins contain grape sugar and acid tartrate of potash, in the preparation of wine from the juice of the grape, the grape sugar becomes converted into alcohol.

Argal consists of the acid tartrate, which is deposited inside the wine casks, it being insoluble in the alcohol that is formed.

Official Preparations.

Tinctura Cardamomi Composita.
Tinctura Sennæ.

NATURAL ORDER.—*Zygophyllaceæ.*

No. 36. Guaiaci Lignum. *Guaiacum Wood.*

The wood of Guaiacum Officinale.

Habitat.—St. Domingo and Jamaica (West Indies).

Characters.—Guaiacum wood is commonly known as *Lignum Vitæ.* It is imported in logs; each log has a large central portion of a greenish brown colour. This is the duramen, or heart wood. The colour of it is owing to the deposit of guaiacum resin in its cells. On the outside of the duramen is the alburnum, or sap wood, which is of a pale yellow colour. The chips or raspings are obtained from the logs during their conversion by the turning lathe into various articles of turning ware.

No. 37. Guaiaci Resina. *Guaiacum Resin.*

A resin obtained from the stem of Guaiacum Officinale, by natural exudation, by incisions, or by heat.

Description.—Guaiacum Resin may be obtained in four different ways.

1. By natural exudation. Guaiacum resin obtained by this method occurs in tears.
2. By making incisions into the stem.
3. By heat. This, which is the general method of extracting guaiacum resin, is performed by cutting the wood into logs. The logs then have a hole bored through them lengthwise, and are placed in a slanting position with one end in a fire. The heat melts the resin, which runs down the hole into a vessel placed to receive it.
4. By boiling the chips in a solution of common salt, when the resin melts and rises to the surface. The solution of salt boils at a higher temperature than water, and so enables the resin to melt.

Guaiacum resin, either in tears or in lumps, as obtained by the third method, may be recognised by being covered externally with a green coloured powder, or, if this be absent, the green colour can be produced by rubbing two pieces together.

Adulteration.—Guaiacum resin is sometimes adulterated with turpentine resin, which may be detected by the terebinthinate odour evolved on heating a sample of the suspected resin; this admixture is rarely practised.

Composition.—Guaiacum resin contains resin of Guaiacum, Guaiacic Acid, and a little extractive matter, soluble in water. A tincture of Guaiacum resin gives a blue colour when applied to the inner surface of a paring of raw potato, due to the action of Guaiacic acid on the gluten, the blue colour is deepest if the tincture be applied to that part of the paring where an eye or bud is situated, since there the greatest portion of gluten resides. Also a piece of paper soaked in the tincture turns blue when exposed to nitrous fumes.

Therapeutics.—Guaiacum resin is a stimulant, alterative and diaphoretic.

Official Preparations.

Of the wood.	Decoctum Sarzæ Compositum.
Of the resin.	Mistura Guaiaci. Pilula Hydrargyri Subchloridi Composita. Tinctura Guaiaci Ammoniata.

NATURAL ORDER.—*Rutaceæ.*

Oleum Rutæ. *Oil of Rue.*

The volatile oil distilled in England from the fresh leaves and unripe fruit of Ruta Graveolens, or common rue.

Habitat.—The rue plant grows wild in the South of Europe, and is cultivated in England.

Composition.—Oil of rue is contained in the glands with which the leaves are dotted, the disagreeable odour of the leaves is due to this volatile oil, rue leaves also contain a bitter extractive matter.

Therapeutics.—Rue acts as a carminative, antispasmodic, and emmenagogue.

No. 38. Buchu Folia.—*Buchu Leaves.*

The dried leaves of Barosma Betulina, B. Crenulata and B. Serratifolia.

Habitat.—Cape of Good Hope (southern extremity of Africa.)

Characters.—Buchu leaves are of a yellowish-green colour, smooth, and of a leathery texture. They are studded with glands containing the volatile oil. The leaves of the three species may be distinguished from one another by the following characters :—

The leaves of Barosma Betulina (Fig. *a*) are the shortest of the three buchus ; they are ovate and recurved at the apex.

The leaves of Barosma Crenulata (Fig. *b*) are longer than those of B. Betulina and shorter than those of B. Serratifolia. They are oval-lanceolate and minutely crenated at the margin (*hence the name Crenulata.*)

The leaves of B. Serratifolia (Fig. *c*) are the longest and narrowest of the three buchus. They are linear-lanceolate, and finely serrated at the margin (*hence the name Serratifolia.*)

Composition.—Buchu leaves contain a volatile oil, and a bitter extractive called barosmin, or diosmin.

Therapeutics.—Buchu is a tonic, but is used chiefly for its action on the urinary organs.

Official Preparations.

Infusum Buchu.
Tinctura Buchu.

No. 39. Cuspariæ Cortex.—*Cusparia Bark.*

The bark of Galipea Cusparia, the Angustura bark tree.

Habitat.—Tropical South America.

Characters.—Cusparia or Angustura bark occurs in curved pieces with bevelled or pared edges, and covered with a yellowish-grey epidermis, which can easily be scraped off. It breaks with a resinous fracture, and possesses an aromatic odour.

Adulteration.—Cusparia Bark was formerly adulterated with the bark of the Nux Vomica tree, which on this account received the name of false angustura bark. Nux Vomica bark is more twisted and thicker in proportion than Cusparia bark. The best test, however, is to apply a drop of nitric acid to the inner surface of the suspected bark ; Nux Vomica bark is turned to a blood-red colour, the colour of Cusparia bark is simply deepened by the application of nitric acid. The blood-red colour is due to the action of nitric acid on the brucia contained in the Nux Vomica bark.

Composition.—Cusparia bark contains a volatile oil, two resins, a hard and soft one, the soft resin gives the colour with nitric acid, and a bitter principle called Angusturine or Cusparine.

Therapeutics.—An aromatic tonic and febrifuge.

Official Preparation.—Infusum Cuspariæ.

NATURAL ORDER.—*Simarubaceæ.*

No. 40. Quassiæ Lignum. *Quassia Wood.*

The wood of Picræna Excelsa.

Habitat.—Jamaica (West Indies).

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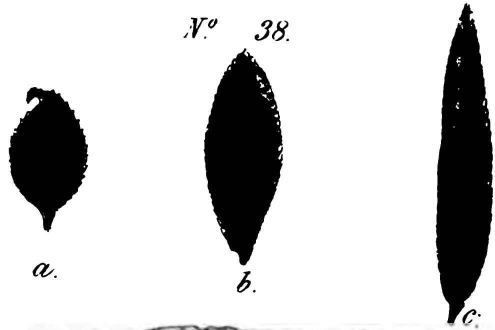

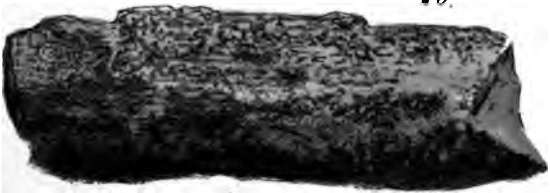

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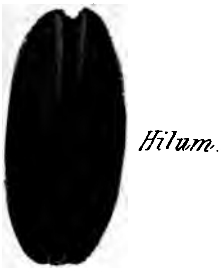

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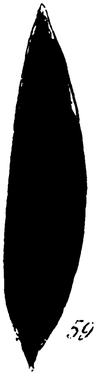

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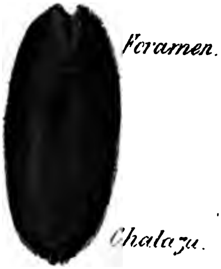

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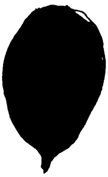
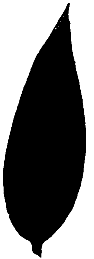




olata. obovata. Nºs 1. 2. 3. 4.

Characters.—Quassia was formerly obtained from Quassia Amara, a native of Surinam, in Borneo; this kind was called Surinam quassia; it is not met with in commerce now. Quassia wood is imported in logs or billets of various sizes, of a yellowish-white colour, and intensely bitter taste. The white efflorescence sometimes observed on the logs consists of nitrate of potash. It is commonly sold in the form of chips or raspings.

Adulteration.—Quassia wood is sometimes adulterated with the chips of other woods, as deal, &c., which may be distinguished by their want of bitterness.

Composition.—Quassia owes its bitterness to a neutral principle called quassine, which is soluble in both water and spirit. Quassia is a pure bitter, containing no tannic acid.

Therapeutics.—A bitter stomachic and tonic.

Official Preparations.

Extractum Quassiæ. Infusum Quassiæ. Tinctura Quassiæ.

(Not official.)

No. 41. Simarubæ Cortex. *Simaruba Bark.*

The bark of the root of Simaruba Amara, the Mountain Damson.

Habitat.—Jamaica and the West Indies.

Characters.—Simaruba bark occurs in long folded pieces, more or less crushed, of a yellowish colour; tough, fibrous, and very difficult to powder.

Composition.—The bark contains quassine, the bitter principle found also in quassia.

Therapeutics.—The same as those of quassia.

Case B.

SUB-CLASS II. Calicyfloræ.

NATURAL ORDER.—*Rhamnaceæ.*

(Not official.)

No. 42. Rhamni Fructus. *Buckthorn Berries.*

The dried ripe fruit of Rhamnus Catharticus.

Habitat.—Indigenous.

Characters.—Buckthorn fruits are about the size of a pea, black, and containing four seeds. The fruit of the Alder Buckthorn and the Dog Wood occasionally get accidentally mixed with Buckthorn berries, they may be readily distinguished by possessing only two seeds.

NATURAL ORDER.—Anacardiaceæ.

No. 43 Masticbe. *Mastich.*

A resinous exudation obtained by incision from the stem of Pistacia Lentiscus.

Habitat.—The island of Scio and the Levant.

Collection.—About July the trees are cut transversely, when the juice exudes; that which hardens on the bark in tears is the best, and is called mastich in the tear; that which falls to the ground and gets earth and other impurities mixed with it is inferior, and known as common mastich.

Characters.—Mastich occurs in small tears of a pale yellow colour, covered with a whitish powder, produced by the tears rubbing together. The larger masses of mastich are less pure than the separate tears, since they generally consist of several tears which have fallen to the ground, and become agglutinated. In the east, mastich is frequently used as a masticatory; hence the origin of its name.

Composition.—Mastich contains a small quantity of a volatile oil, and two resins called masticic acid and masticine. Masticic acid, which exists in mastich to the extent of 90 per cent., is soluble in alcohol; masticine, of which there is 10 per cent. present in mastich, is insoluble in alcohol. Both resins are soluble in ether.

No. 44. Terebinthina Chia. *Chian Turpentine.*

(Not Official.)

An oleo-resin, obtained by making incisions into the stem of Pistacia Terebinthus; it flows down the stem on to stones placed to receive it; it is then allowed to harden.

Habitat.—The Grecian Archipelago.

Characters.—Chian turpentine is of a pale yellow colour; when imported it is of the consistence of honey; by keeping it solidifies, on account of the evaporation of the volatile oil.

Adulterations.—The turpentines obtained from the coniferæ are frequently sold for it.

Composition.—The same as the coniferous turpentines, consisting of a resin dissolved in a volatile oil.

Therapeutics.—Similar to the coniferous turpentines.

NATURAL ORDER.—Amyridaceæ.

No. 45. Myrrha. *Myrrh.*

A gum-resin, exuding from the stem of Balsamodendron Myrrha.

Habitat.—Abyssinia and Arabia Felix (east of Africa), this district is called the myrrh and frankincense district.

Collection.—Myrrh is an exudation partly natural and partly obtained by incisions. Myrrh is first sent to India, and from there imported to this and other countries. The best kind of myrrh was called Turkey myrrh, on account of its being formerly brought from Turkey.

Characters.—Myrrh when first obtained from the tree, is of a pale yellow colour; by drying it acquires a reddish-brown colour, on account of the evaporation of the water. The best myrrh should consist of tears or masses of tears, of a reddish brown colour externally; it should have a very brittle, irregular fracture, and present a dull oily appearance when broken; good myrrh should possess an aromatic odour, especially when breathed on; when broken, myrrh frequently presents internally a number of white veins or spots, due to some water being left by imperfect drying. An inferior variety of myrrh called myrrh in sorts, consists of different qualities mixed. A third variety, called East Indian myrrh, consists of dark pieces mixed with gums and other adulterations.

Adulterations.—Myrrh is adulterated with Indian Bdellium and various gums and resin. Indian Bdellium obtained from Amyris Commiphora, may be distinguished from myrrh by its want of fragrant odour, by its becoming soft when held in the hand for some time, and by goats' hairs being frequently found sticking to the pieces (bdellium, being softer than myrrh, runs to the foot of the tree, against which the goats rub.) Gums and resins may be detected by their want of odour and by their fractured surfaces being shiny, not dull and oily as is the case with myrrh.

Composition.—Myrrh contains a volatile oil, resin, and gum. The volatile oil, which gives the odour to myrrh, constitutes about 2·5 per cent. The resin, of which there is about 28 per cent., consists of two kinds, a hard and a soft resin; the hard resin possesses the properties of an acid, and is called myrrhic acid. The gum is also of two kinds, consisting principally of a soluble gum (arabin), with a small quantity of an insoluble gum (bassorin).

With water myrrh forms a milky emulsion, due to the suspension of the resin in the dissolved gum. The best solvent of myrrh is proof spirit, the spirit of which dissolves the resin, and the water the gum.

Therapeutics.—A stimulant, an antispasmodic, and an emmemagogue.

Official Preparations.

Decoctum Aloes Compositum.	Pilula Rhei Composita.
Pilula Aloes et Myrrhæ.	Mistura Ferri Composita.
Pilula Assafœtidæ Compositа.	Tinctura Myrrhæ.

No. 46. Elemi. *Elemi.*

A concrete resinous exudation from Canarium Commune.

Habitat.—Manilla.

Characters.—It occurs in masses of a soft consistence, becoming harder by keeping, of a light yellow colour, and a peculiar fennel-like odour.

Composition.—Elemi consists of a volatile oil and resin. The hardening of Elemi is caused by the evaporation of this volatile oil.

Therapeutics.—Only used externally in the form of an ointment.

Official Preparation.—Unguentum Elemi.

No. 47. Olibanum. *Frankincense.*

(Not Official.)

A gum-resinous exudation obtained from Boswellia Thurifera and other species.

Habitat.—Africa and India.

Characters.—It occurs in the form of oblong tears, of a pale yellow colour, and a balsamic odour. It is principally used for burning as incense.

Composition.—Olibanum consists of a volatile oil, gum, and resin.

NATURAL ORDER.—**Leguminosæ.**
SUB-ORDER.—**Papilioneæ.**

No. 48. Glycyrrhizæ Radix. *Liquorice Root.*

The fresh and dried root of Glycyrrhiza Glabra.

Habitat.—Cultivated in England.

Characters.—Liquorice root is about the size of the little ger; it has a brown cortical portion, and is of a yellow our inside. For medicinal use the root should be deticated, as the acridity resides is the cortical portion.

Composition.—The sweetness of the root is due to a kind sugar called glycyrrhizin ; it also contains gum.

Therapeutics.—Emollient and demulcent.

Official Preparation.—Extractum Glycyrrhizæ.

Solazzi juice or liquorice is an extract of liquorice root.

No. 49. Tragacantha. *Tragacanth.*

A gummy exudation, exuding from the stem of Astragalus rus, and possibly other species.

Habitat.—Asia Minor.

Collection.—Tragacanth is obtained by natural exudation by incision. That obtained by incision is the best, since stems are only incised in fine warm weather, and the acanth then dries quickly and retains its white colour. t obtained by natural exudation is in small pieces of a ow colour, because it frequently exudes in damp weather, then takes longer to dry.

Characters.—Tragacanth is commonly called gum dragon. best kind occurs in semi-transparent flakes, waved centrically. With water it forms a gelatinous mass.

Adulterations.—Tragacanth is sometimes adulterated h Caramania and Moussul gums. They may be de- ed by occurring in small pieces (not flaky), and by g whitened externally with carbonate of lead.

Composition.—Tragacanth contains 2 gums, *tragacanthin*, soluble gum, and *bassorin*, or insoluble gum. Tragathin may be distinguished from arabin (the gum conned in gum arabic) by not forming a jelly with peroride of iron ; arabin does.

Therapeutics.—Demulcent.

Official Preparations.

Mucilago Tragacanthæ.
Pulvis Tragacanthæ Compositus.

No. 50. Mucuna. *Cowhage.*

(Not Official.)

The hairs of the legume of Mucuna Pruriens.

Habitat.—West Indies.

Composition.—The hairs contain tannic acid.

Therapeutics.—Cowhage or cow-itch is used as an anthelmintic. The hairs act mechanically by irritating the worms, and thus causing them to leave go their hold on the coats of the stomach.

No. 51. Scoparii Cacumina *Broom Tops.*

The fresh and dried tops of Sarothamnus Scoparius.

Habitat.—Indigenous.

The fresh tops are used for obtaining the juice; the dried tops for making the decoction.

Composition.—Broom tops contain a neutral principle called scoparin, to which its diuretic properties are due, and a liquid volatile alkaloid called sparteine, which is poisonous.

Therapeutics.—Diuretic.

Official Preparations.

Decoctum Scoparii. Succus Scoparii.

No. 52. Pterocarpi Lignum. *Red Sandal Wood.*

The wood of Pterocarpus Santalinus.

Habitat.—Coromandel and Ceylon.

Characters.—Imported in billets. Very heavy. Used in the form of raspings.

Composition.—A colouring matter called santaline.

Sandal wood is used to give colour to compound tincture of lavender.

No. 53. Kino. *Kino.*

The inspissated juice obtained from incisions made in the trunk of Pterocarpus Marsupium.

Habitat.—Malabar (India.)

Characters.—The kinos are inspissated juices; the catechus are extracts. Kino occurs in angular glistening fragments, very brittle, ruby-red at the edges. A bitter astringent taste, followed by a sweet taste. Three other kinds of kino are sometimes met with, viz.:—

1. Botany Bay Kino, obtained from Eucalyptus Resinifera.
2. Jamaica Kino, obtained from Coccoloba Uvifera.
3. African Kino, obtained from Pterocarpus Erinaceus.

The latter was the first kino known in this country.

Composition.—Kino contains tannic acid and catechine, to both of which its astringent properties are due.

Therapeutics.—Astringent.

Official Preparations.

Pulvis Kino Compositus. Tinctura Kino.

Contained also in Pulvis Catechu Compositus.

No. 54. Balsamum Peruvianum. *Balsam of Peru.*

A balsam obtained from the trunk of Myroxylon Pereiræ.

Habitat.—Salvador in Central America.

Collection.—The bark is bruised, and scorched by torches being applied to it, by which means it separates from the wood; the balsam then exudes and soaks into rags, which are inserted between the bark and the wood; the rags are boiled with water, when the balsam sinks to the bottom. Balsam of Peru is sent into the market enclosed in gourds.

Characters.—Balsam of Peru is a reddish-brown liquid, of the consistence of treacle; it is inflammable, and is soluble in 5 parts of rectified spirit.

Adulterations.—Balsam of Peru is rarely adulterated. Spirit, if used to adulterate it, might be detected by shaking the balsam up with water, when it would undergo a diminution in volume. Copaiva, which is sometimes used to adulterate it, may be detected by distilling a few drops and adding iodine, when an explosion results, if copaiva is present, due to the formation of hydriodic acid.

Composition.—Balsam of Peru contains volatile oil, cinnamic acid and resin. The cinnamic acid is formed by the oxidation of the volatile oil; the resin by the union of the volatile oil with the elements of water.

Therapeutics.—A stimulant and expectorant.

No. 55. Balsamum Tolutanum. *Balsam of Tolu.*

A balsam obtained by making incisions in the trunk
Myroxylon Toluifera.

Habitat.—New Granada (South America.)

Characters.—Balsam of Tolu, when first imported, is so
like thick honey, but becomes hard by keeping ; this is du
to the conversion of some of the volatile oil into cinnami
acid and resin.

Adulteration.—Common resin is said to have been use
to adulterate Balsam of Tolu, it may be detected by means
strong sulphuric acid. Balsam of Tolu dissolves in su
phuric acid, forming a red liquid ; but if common resin b
present, the liquid turns black.

Composition.—Balsam of Tolu contains volatile oi
cinnamic acid, and resin, the same as Balsam of Peru.

Therapeutics.—The same as the Balsam of Peru.

Official Preparations.

Syrupus Tolutanus. Tinctura Tolutana.

Contained also in Tinctura Benzoini Composita.

No. 56. Physostigmatis Faba. *Calabar Bean.*

The seed of Physostigma Venenosum.

Habitat.—Western Africa.

Characters.—Calabar beans, or rather seeds, are about on
inch long, of a reniform shape, with a reddish-brown test
enclosing two white cotyledons. The convex edge is tr
versed by a furrow, which is the hilum. At one extremit
of the hilum a little slit (the foramen) is visible ; at th
other extremity the chalaza is present in the form of
little swelling.

Adulteration.—The seeds of cowhage have been sold f
calabar beans, but may be readily distinguished by attenti
to the characters mentioned above.

Composition.—Calabar beans owe their activity to
poisonous alkaloid, physostigmine, which principally exis
in the cotyledons.

Therapeutics.—Principally used for producing contracti
of the pupil of the eye.

Official Preparation.—Extractum Physostigmatis.

SUB-ORDER.—**Cæsalpinieæ.**

No. 57. Hæmatoxyli Lignum. *Logwood.*

The sliced heart-wood or duramen of Hæmatoxylon Campechianum.

Habitat.—Campeachy. Grown also in West Indies.

Characters.—Only the duramen must be used. The logs are heavy and sink in water. The crystals frequently found in the logs consist of hæmatin.

Composition.—Logwood contains hæmatin, tannin, resin, and volatile oil. The odour of the volatile oil resembles that of violets.

Therapeutics.—An astringent.

Official Preparations.

Decoctum Hæmatoxyli. Extractum Hæmatoxyli.

No. 58. Senna Alexandrina. *Alexandrian Senna.*

The leaflets of Cassia Lanceolata and Cassia Obovata.

Habitat.—Egypt and Nubia. Imported from Alexandria.

Characters.—Alexandrian Senna is composed of lanceolate and obovate leaflets, unequal at the base and of a green colour. It should be picked free from argel leaves, with which it is generally adulterated. It is stated that Alexandrian Senna is made up of five parts of the leaflets of Cassia Lanceolata, three parts of the leaflets of Cassia Obovata, and two parts of argel leaves.

Adulterations.—Alexandrian Senna is adulterated with the leaflets and pods of (1) Solenostemma argel, (2) Tephrosia Apollinea, (3) Colutea arborescens, and (4) Coriaria myrtifolia.

The leaves of (1) may be distinguished by being equal at the base, thick and leathery, pale in colour, and the veins imbedded in the leaf so as to be invisible.

The leaves of (2) may be detected by being equal at the base, with an emarginate apex, and generally folded in a conduplicate manner.

The leaves of (3) may be distinguished by being equal at the base.

The leaves of (4), which are poisonous, may be detected by being equal at the base, and by having a prominent vein running within the margin.

No. 59. Senna Indica. *Tinnivelly Senna.*

The leaflets of Cassia Elongata.

Habitat.—Southern India.

Characters.—Tinnivelly Senna is a very fine variety, being free from adulterations. It consists of long leaflets, of a lanceolate shape and unequal at the base.

Another kind of senna, called East Indian Senna, is also obtained from Cassia Elongata; it only differs from Tinnivelly Senna on account of its growth in a different climate and soil.

Composition.—Senna contains a volatile oil and cathartin; to the latter its purgative properties are due. It is stated that good Alexandrian Senna yields half as much again of the active principle as the Tinnivelly Senna.

Therapeutics.—Purgative.

Either the Alexandrian or the Tinnivelly Senna may be used in the B. P. preparations.

Official Preparations.

Confectio Sennæ.
Infusum Sennæ.
Mistura Sennæ Composita.
Syrupus Sennæ.
Tinctura Sennæ.

No. 60. Cassiæ Pulpa. *Cassia Pulp.*

The pulp obtained from the pods of Cassia Fistula.

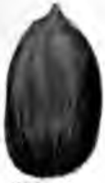
Habitat.—East and West Indies.

Characters.—The Cassia pod or lomentum is from 1 to 2 feet long; it is marked on one side by two contiguous bands, which constitute the ventral suture, and on the opposite side by one band, which constitutes the dorsal suture. It is divided into a number of cells by means of several transverse spurious dissepiments; in each cell is a seed imbedded in the pulp. The seeds should not rattle when the pod is shaken; if they do, the pulp has dried up. The pulp is obtained by boiling the crushed pods with water.

Therapeutics.—A slight laxative.

Plate 9.

No 60.



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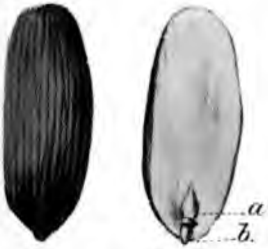

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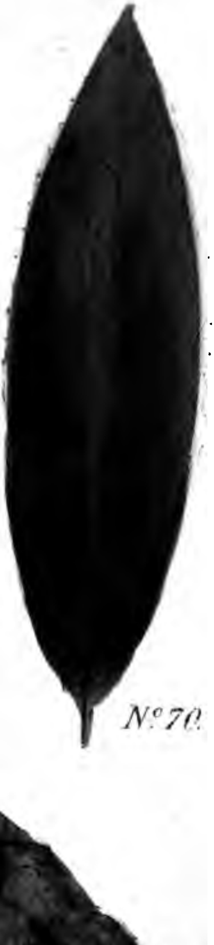

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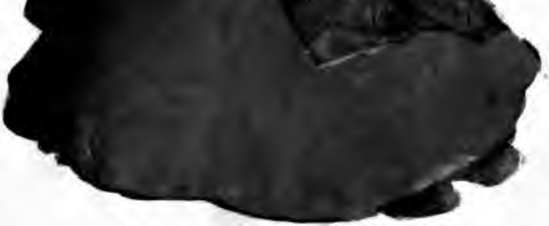


No 63.

No. 61. Copaiba. *Copaiva.*

The oleo-resin obtained from incisions made in the trunk of Copaifera Multijuga, and other species of Copaifera.

Habitat.—The valley of the Amazon in South America.

Collection.—Copaiva is obtained by boring the trees nearly to the pith, when it flows out.

Characters—Copaiva is a transparent liquid, of a light yellow colour and peculiar odour. It is wrongly termed a balsam, since it neither contains benzoic nor cinnamic acids, one of which must be present in a balsam. It is an oleo-resin, that is a solution of resin in a volatile oil.

Adulterations.—Wood oil or Gurjum Balsam, an oleo-resin obtained from Dipterocarpus turbinatus (Dipteraceæ), has been used to adulterate copaiva. It may be detected by heating to 270° F., when it thickens ; copaiva does not. Good copaiva will dissolve a quarter of its weight of carbonate of magnesia by heat and remain clear ; if wood oil is present, it will be cloudy.

Turpentine, castor oil, and the other fixed oils have also been used to adulterate copaiva. Turpentine is detected by its odour on heating the copaiva. The fixed oils may be detected by the carbonate of magnesia test.

Composition.—Copaiva contains about 50 per cent. of hard resin (copaivic acid), 40 per cent. of volatile oil, and 2 per cent. of a soft resin. The latter is more abundant in old than recent copaiva, and is probably formed by some alteration of the acid resin.

Therapeutics.—A stimulant in discharges from the mucous membranes.

SUB-ORDER.—Mimoseæ.

No. 62. Acaciæ Gummi. *Gum Acacia.*

A gummy exudation from the stem of one or more undetermined species of acacia.

Habitat—Cordofan, in Eastern Africa.

Characters.—Gum acacia is usually a natural exudation from the stem, though sometimes incisions are made to favour its flow. It occurs in tears, more or less opaque, from a number of cracks extending through them. It is very brittle. Soluble in water; insoluble in alcohol.

Adulterations.—Inferior gums, such as Barberry and Senegal gums, are mixed with gum arabic. These are detected by their darker colour, their want of brittleness, and their imperfect solubility in water.

Composition.—Gum consists of arabin with 17 per cent. of water. The arabin is an acid, called gummic acid, and exists in the gum as gummate of calcium.

Official Preparation.—Mucilago Acaciæ.

No. 63. Catechu Nigrum. *Black Catechu.*

(Not Official.)

An extract of the heart-wood of Acacia Catechu.

Habitat.—East Indies. Imported from Pegu.

Characters—Black catechu, commonly called ***cutch,*** occurs in masses of a black colour, enveloped in rough leaves. It is used largely for tanning.

Composition—Tannic acid and catechine (see pale catechu.)

Therapeutics.—Astringent.

NATURAL ORDER.—Rosaceæ.

No. 64. Rosæ Centifolæ Petala. *Cabbage Rose Petals.*

The fresh petals of the Rosa Centifolia.

Habitat.—Cultivated in Britain.

Composition.—These petals are used on account of their odour, which is due to a volatile oil. This volatile oil, called otto of roses, is obtained by distilling the flowers with water; when cold, it concretes and floats on the surface of the water.

Official Preparation.—Aqua Rosæ.

No. 65. Rosæ Gallicæ Petala. *Red Rose Petals.*

The fresh and dried unexpanded petals of Rosa Gallica.

Habitat.—Cultivated in Britain.

Characters.—The flowers are collected when about the size of a nutmeg, their white claws are cut off, and they are then dried. They should be kept away from the light, in order to preserve their colour.

Composition.—These petals contain tannic and gallic acids, and a red colouring matter. An infusion of them is turned bright red by acids, and green by alkalies.

Official Preparations.

Confectio Rosæ Gallicæ. Infusum Rosæ Acidum.
Syrupus Rosæ Gallicæ.

No. 66. Rosæ Caninæ Fructus. *Hips.*

The fresh fruit of Rosa Canina, the dog rose, and other allied species.

Habitat.—Indigenous.

Characters.—The fruit (a cynarrhodum) is of an oval shape and about an inch long. It consists of a concave thalamus, to which the calyx is attached on the outside. Inside are a number of small hairy fruits (achænia), which are improperly called seeds.

Composition.—The pulp contains citric and malic acids, with sugar and a little tannin.

Official Preparation.—Confectio Rosæ Caninæ.

No. 67. Tormentillæ Rhizome. *Tormentilla Rhizome.*

(Not Official.)

The dried rhizome of Potentilla Tormentilla.

Habitat.—Indigenous.

Characters.—The rhizome is knotty, and has a number of radicles attached to it. It is dark brown externally, and of a reddish colour internally.

Composition.—Tormentilla contains about 18 per cent. of tannic acid, to which its properties are due.

Therapeutics.—Astringent.

Official Preparations.

Mistura Amygdalæ. Pulvis Amygdalæ Compositus.

70. Lauro-Ceraci Folia. Cherry-Laurel Leaves.

The fresh leaves of Prunus Lauro-Cerasus.

Habitat.—Cultivated in England.

Characters.—The leaves of the cherry laurel are about four inches long and two broad, of a lanceolate shape and coriaceous texture.

Composition.—It is believed that cherry-laurel leaves contain amygdalin and some substance analagous to emulsin, for when distilled with water they yield oil of bitter almonds and hydrocyanic acid, from 3 to 8 per cent.

Therapeutics.—The same as those of prussic acid.

Official Preparation.—Aqua Lauro-Cerasi.

71. Cusso. Kousso.

The flowers and tops of Brayera Anthelmintica.

Habitat.—Abyssinia.

Characters.—Kousso occurs in bunches of flowers, which are small, of a reddish brown colour, and situated on hairy stalks. The flowers are diœcious, that is, the male and female organs are found in separate flowers and on separate plants.

Composition.—Kousso contains a volatile oil, astringent matter, a bitter resin, and a principle called koussine. It is not known whether the activity is due to the resin or the koussine.

Therapeutics.—Kousso acts as an anthelmintic.

Official Preparation.—Infusum Cusso.

Natural Order.—Myrtaceæ.

72. Caryophyllum. Cloves.

The dried unexpanded flowers of Caryophyllus Aromaticus.

Habitat.—Penang, Bencoolen, and Amboyna.

Characters.—Cloves are termed in the Pharmacopœia the unexpanded flower buds. This description is too full, since a flower bud must be unexpanded, or it would be a flower.

The radiating part of the clove (*a*), consists of the four-toothed calyx. On the top (*b*) is situated the unexpanded corolla in the form of a ball. Within this ball or corolla are a number of small stamens.

Mother cloves are the dried fruits of the clove tree; they are occasionally found in commerce.

Composition.—Cloves owe their active properties to a volatile oil; they also contain tannic acid. Oil of cloves is one of the few volatile oils heavier than water. It is composed of two oils, one lighter than water, and isomeric with oil of turpentine, and one heavier than water, called caryophyllic acid. A good clove should contain $\frac{1}{6}$th of its weight of volatile .oil, and should show the oil when indented with the nail.

Therapeutics.—Aromatic and carminative.

Official Preparations.

Infusum Caryophylli. Oleum Caryophylli.

73. Pimenta. Pimento.

The dried unripe berries of Eugenia Pimenta.

Habitat.—West Indies.

Characters.—Pimento or allspice berries must be gathered when unripe; if left till ripe they lose their volatile oil. Pimento is an inferior fruit about the size of a pea; the ring at the apex (*a*) is the limb or free portion of the superior calyx; within are two seeds lying loose. The active portion is the calyx.

Composition.—Pimento contains volatile oil, resin and tannin. The volatile oil, like that of cloves, consists of two oils, a light and a heavy one, the latter being called eugenic acid.

Therapeutics.—Stimulant and carminative.

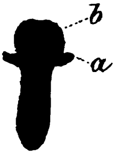
Official Preparations.

Aqua Pimentæ. Oleum Pimentæ.

Oleum Cajuputi. Oil of Cajuput.

The oil distilled from the leaves of Melaleuca Minor.

Plate 10.



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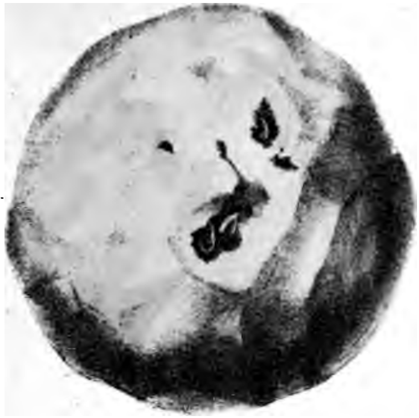

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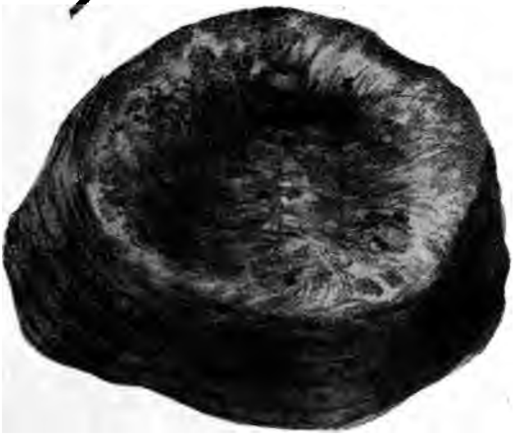


No 82.

Habitat.—Molucca Islands, imported from Batavia and Singapore.

Collection.—The leaves are allowed to ferment by macerating them in water, they are then submitted to distillation, when the oil distils over and floats on the surface of the water.

Characters.—Oil of cajuput has a strong odour, resembling that of camphor and cardamoms combined, and a bluish-green colour ; this colour may be due to the chlorophyll, or green colouring matter of the leaves, it is natural to the oil, and is not due to any salt of copper, although copper has sometimes been found present as an adulteration.

Therapeutics.—Stimulant and antispasmodic.

74. Granati Radicis Cortex. Pomegranate Root Bark.

The dried bark of the root of Punica Granatum.

Habitat.—South of Europe.

Characters.—The root-bark occurs in thin quilled pieces, with a very astringent taste.

Three root-barks are used in medicine, viz., pomegranate root-bark, simaruba bark, and mezereon bark ; the latter may consist of the bark of the root or stem.

The rind of the pomegranate fruit was formerly official ; the fruit is a balausta, the peculiarity of which is that the carpels are arranged in two rows, one above the other.

Adulterations.—Box bark and barberry bark are used to adulterate it ; they are distinguished by their intense bitterness.

Composition.—The bark contains 20 per cent. of tannic acid, to which its properties are due, and a principle called punicine.

NATURAL ORDER.—Cucurbitaceæ.

75. Colocynthidis Pulpa. Colocynth Pulp.

The dried decorticated fruit, freed from the seeds, of Citrullus Colocynthis. The seeds may be detected in the powder by their imparting an oily stain to paper when pressed between the folds of it.

Habitat.—Smyrna, Trieste, France, and Spain.

Characters.—Colocynth fruit is a pepo, which is a fruit resembling a berry in being inferior, but differing from it by having its seeds attached to placentas.

There are two varieties of colocynth in commerce :—

1. Turkey or peeled colocynth.
2. Mogadore or unpeeled colocynth.

The Turkey or peeled colocynth is the best, and is the official variety. The pulp, freed from the seeds, only should be used. The fruit contains about 70 per cent. of seeds, and, as they are inactive, their removal is essential.

The Mogadore colocynth is covered over with a smooth rind ; it is larger than the other variety, and is inferior to it.

Composition.—Colocynth owes its activity to a bitter principle, colocynthin, a glucoside.

Therapeutics.—A drastic purgative.

Official Preparations.

Extractum Colocynthidis Compositum.
Pilula Colocynthidis Composita.
Pilula Colocynthidis et Hyoscyami.

76. Elaterium. *Elaterium.*

A sediment from the juice of the fruit of Ecbalium Officinarum, the squirting cucumber fruit.

Preparation.—The fruit is cut lengthwise, the juice lightly pressed out, strained, and allowed to stand ; the deposit which settles down when dried constitutes Elaterium. Elaterium is found only in the juice around the seeds. Ecbalium fruit, like that of the colocynth, is a pepo ; when ripe its seeds are violently ejected, hence its common name of squirting cucumber.

Characters.—Two kinds of elaterium are known in commerce, English and Maltese. The English only should be used, as the Maltese is very inferior and is adulterated.

Adulterations.—Starch and chalk. Good elaterium should not give a blue colour on the addition of iodine to its cold decoction, showing absence of starch. Chalk is detected by the effervescence on the addition of hydrochloric acid.

Composition.—The active principle of elaterium is elaterine, of which at least 20 per cent. should be present. A test of the activity of elaterium is to estimate the amount of elaterine, which is done by dissolving elaterium in boiling rectified spirit, concentrating and adding a warm solution of caustic potash, when at least 20 per cent. of elaterine should be deposited in crystals.

Therapeutics.—A drastic purgative.

NATURAL ORDER.—*Umbelliferæ.*

77. **Conii Folia.** *Hemlock Leaves.*

The fresh leaves and young branches of the Conium Maculatum, and the dried leaves; to be gathered when the fruit begins to form.

Habitat.—Indigenous.

Characters.—The Conium plant is commonly called the spotted hemlock, on account of its stem being dotted with dark purple spots. The leaves are decompound, that is, they are more than three times divided in a pinnate manner.

The fresh leaves are used in
Extractum Conii. Succus Conii.
The dried leaves are used in
Cataplasma Conii.

78. **Conii Fructus.** *Hemlock Fruit.*

The ripe dried fruit of the Conium Maculatum.

Characters.—Conium fruit is a cremocarp, consisting of two mericarps, with undulating crenulated ridges, between which are the vittæ, which in the case of conium fruit contain no volatile oil. Although the ripe fruit is ordered in the Pharmacopœia, it is of little use, since the fruit in ripening loses most of its activity; the fruit gathered just as it is losing its green colour is the most active.

Composition.—The leaves and fruit contain conia, to which they owe their activity. Conia is a liquid volatile alkaloid, existing in the plant combined with coniic acid;

it is obtained on distilling any part of the plant with w and caustic potash. It has a peculiar odour, resemb that of mice. This is the only alkaloid which has b formed artificially.

Therapeutics.—A sedative.

Official Preparation.—Tinctura Conii.

79. **Assafœtida.** Assafœtida.

A gum-resin obtained by incision from the living root Narthex Assafœtida.

Habitat.—Affghanistan and the Punjaub (North India.)

Collection.—When the plant is sufficiently grown, stem is cut off, and the earth around the root remove the top of the root is then sliced off, and the assafœt that exudes scraped off; another slice is then cut off wood and the exuded assafœtida removed, and so on.

Characters.—Assafœtida occurs in tears or in masses agglutinated tears; the masses when cut, present amygdaloid appearance, due to the lighter-coloured te being embedded in the reddish substance used to ur them; by exposure to light assafœtida turns pink a afterwards dark-red; it has a strong, disagreeable odo

Adulterations.—Mechanical impurities such as sa stones, &c., are sometimes found in assafœtida.

Composition.—Assafœtida contains gum, resin, and volatile oil; the volatile oil is present to the extent 4 per cent.; it contains sulphur existing as a sulphide o hydrocarbon; to this oil the odour of assafœtida is due.

Therapeutics.—A powerful antispasmodic.

Official Preparations.

Enema Assafœtidæ.
Pilula Aloes et Assafœtidæ.
Pilula Assafœtidæ Composita.
Spiritus Ammoniæ Fœtidus.
Tinctura Assafœtidæ.

80. **Galbanum.** *Galbanum.*

A gum-resin obtained by incision from the stem of Ferula Galbaniflua.

Habitat.—Persia.

Characters.—Galbanum occurs in tears, or more frequently in masses, consisting of agglutinated tears. It is frequently mistaken for ammoniacum, from which it can be distinguished by always having bits of dirt sticking to it, and by being much softer.

Composition.—Gum, resin, and volatile oil.

Therapeutics.—Antispasmodic and expectorant.

Official Preparation.—Emplastrum Galbani.

81. **Ammoniacum.** *Ammoniacum.*

A gum-resinous exudation from the stem of Dorema Ammoniacum. It is believed to exude from punctures made in the bark by beetles.

Habitat.—Persia, and the Punjaub.

Characters.—Ammoniacum occurs in tears or in masses of agglutinated tears, presenting an amygdaloid appearance when broken. The tears are by far the best.

Composition.—Gum, resin, and volatile oil.

Therapeutics.—Expectorant and local irritant.

Official Preparations.

Emplastrum Ammoniaci c̄ Hydrargyro.
Mistura Ammoniaci.

The fruits of Pimpinella Anisum (Anise), Fœniculum dulce (Fennel), Coriandrum Sativum (Coriander), Carum Carui (Caraway), and Anethum Graveolens (Dill) are all official on account of the volatile oils that they contain. All these fruits, which are frequently improperly called seeds, are cremocarps and are surmounted by a double fleshy disk, termed a stylopodium.

82. **Sumbul Radix.** *Sumbul Root.*

The root of Euryangium Sumbul; commonly called Musk Root.

Habitat.—Russia and India.

Characters.—Sumbul Root occurs in circular pieces, generally from 2 to 5 inches in diameter, consisting of transverse sections of the root. Its odour is like that of musk. Two varieties occur in commerce, the Russian and the Indian; the Russian is of a looser texture than the Indian and has bristles externally.

Composition.—Sumbul Root contains a volatile oil, and 2 resins; its active properties are due to the resins.

Therapeutics.—Stimulant.

Official Preparation.—Tinctura Sumbul.

Case C.

SUB-CLASS III. **Corollifloræ.**

NATURAL ORDER.—*Caprifoliaceæ.*

83. Sambuci Flores. *Elder Flowers.*

The fresh flowers of Sambucus Niger.

Habitat.—Indigenous.

Characters.—Elder Flowers occur in corymbose cymes.

Composition.—A volatile oil, to which their odour is due.

Official Preparation.—Aqua Sambuci.

NATURAL ORDER.—*Cinchonaceæ.*

84. Cinchonæ Flavæ Cortex.—*Yellow Cinchona Bark.*

The bark of Cinchona Calisaya.

Habitat.—Peru and Bolivia (South America.)

Characters.—Two varieties of the Cinchona Calisaya bark are official; viz., the quilled and the flat. The quilled bark occurs in quills of a yellow colour, about $\frac{1}{4}$ to $\frac{1}{2}$ an inch in diameter and covered externally with lichens. The quilled yellow cinchona bark is sometimes mistaken for pale cinchona bark, but the larger size of the quills and their very short fracture will at once distinguish the two; quilled cinchona bark consists of the entire bark, and it is generally obtained from the young branches.

The flat cinchona bark is obtained from the stem of the tree, and has the outer portion of the bark removed, so that it consists of the endophlœum or liber bark, with

Plate II.

N° 84.

N° 84. a.

portions of the mesophlœum adhering to it. This bark may be distinguished from any others by the two following characters:

(I.) It presents grooved depressions on its outer surface, caused by the shape of the instrument used to remove the outer bark.

(II.) Its fracture is very short, being the shortest fracture of any of the cinchona barks.

Adulteration.—Carthagena or Coquetta bark (84*a*) is used to adulterate yellow bark. This bark, which is obtained from Cinchona lancifolia, is official, but only as a source of quinine; it can readily be distinguished from the yellow bark by having a smooth, velvety, spongy appearance externally, and a long splintery fracture.

Composition.—Yellow Cinchona bark should contain not less than 2 per cent. of quinine, which exists combined with kinic acid; it also contains cinchonine, and a red colouring matter called cinchotannic acid. Some specimens of yellow bark from India have yielded as much as 10 per cent. of quinine.

85. **Cinchonæ Pallidæ Cortex.** *Pale Cinchona Bark.*

The bark of Cinchona Condaminea, called Loxa or Crown Bark.

Habitat.—Loxa in Ecuador (South America.)

Characters.—This bark occurs in small quills, covered externally with lichens of a light colour, it has circular cracks and a short fracture.

Composition.—Pale bark contains from ½ to 1 per cent. of alkaloids, which consist principally of cinchonine with a very little quinine.

86. **Cinchonæ Rubræ Cortex.** *Red Cinchona Bark.*

The bark of Cinchona Succirubra.

Habitat.—The western slopes of Chimborazo (South America.)

Characters.—Red Cinchona Bark generally occurs in flattened pieces, of a dark-red colour internally and brownish red externally; the pieces are much thicker than any of the other cinchona barks. Lately red cinchona bark has been sent over from India in the form of very thin quills, about the size of the quills of pale cinchona bark; from this last-mentioned bark, it may be distinguished by being destitute of lichens and by being darker in colour internally.

Adulteration.—Red Cinchona of Santa Fé has been used to adulterate red cinchona bark; it is hard, horny and possesses deep cracks.

Composition.—Red Cinchona Bark contains about 2 per cent. of alkaloids, quinine and cinchonine in almost equal proportions; also cinchona red and cinchotannic acid.

Therapeutics.—The Cinchona barks possess tonic, anti-periodic, and astringent properties.

With regard to the composition of the different barks it will be noticed that—

Yellow bark contains principally quinine.

Pale bark contains principally cinchonine.

Red bark contains a mixture of the two, quinine and cinchonine.

Official Preparations.

Of yellow bark.	Decoctum Cinchonæ Flavæ. Extractum Cinchonæ Flavæ Liquidum. Infusum Cinchonæ Flavæ. Quiniæ Sulphas. Tinctura Cinchonæ Flavæ.
Of Carthagena Bark.	Quiniæ Sulphas.
Of Pale Bark.	Mistura Ferri Aromatica. Tinctura Cinchonæ Compositæ.

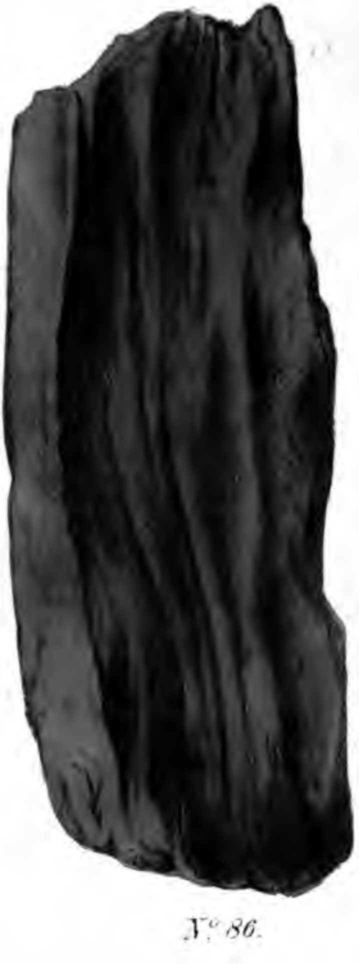
87. Ipecacuanha. *Ipecacuanha.*

The dried root of Cephaelis Ipecacuanha.

Habitat.—Brazil (South America.)

Characters.—Ipecacuanha root is what is termed an annulated root, the cortical portion being divided into the form of rings which are strung as it were upon the meditullium. The activity resides entirely in the cortical portion. The smooth portions that are frequently found

N° 85



N° 86.

mples of ipecacuanha are portions of the stem ; they d be rejected as they are worthless. There are three ties of ipecacuanha:—

Red Ipecacuanha.
Grey Ipecacuanha.
Brown Ipecacuanha.

he brown variety is the best. In 100 parts of good acuanha, there are 80 parts of cortical portion and 20 ts of meditullium.

dulterations.—Striated Ipecacuanha, the root of Psycho- Emetica, is used to adulterate Ipecacuanha ; it is own by possessing striæ or longitudinal depressions necting the rings of circular depressions. Undulated cacuanha, the root of Richardsonia Scabra, is known by wavy form.

Composition.—Ipecacuanha root contains 1 per cent. of an kaloid emetine, to which its active properties are due.

The emetine exists in combination with ipecacuanhic acid.

Therapeutics.—Expectorant, diaphoretic, and emetic.

Official Preparations.

Pilula Ipecacuanhæ cum Scilla.
Pulvis Ipecacuanhæ Compositus.
Trochisci Ipecacuanhæ.
Vinum Ipecacuanhæ.

88. Catechu Pallidum. *Pale Catechu.*

An extract from the leaves and young shoots of Uncaria ambir.

Habitat—Singapore and Eastern Archipelago.

Characters.—Pale Catechu, or Terra Japonica as it is lled, occurs in cubical pieces about an inch in diameter ; hese pieces are light and will float in water. It is obtained y evaporating a decoction of the leaves and young shoots own to an extract, spreading the extract out, cutting it up to cubical pieces, and allowing these to dry.

Composition.—Pale catechu contains tannic acid and atechuic acid, 40 per cent. of the two together. The annic acid is a different variety to the ordinary kind, in hat it yields a green precipitate with ferric salts.

Therapeutics.—A powerful astringent.

Official Preparations.

Infusum Catechu.
Pulvis Catechu Compositus.
Tinctura Catechu.
Trochisci Catechu.

Natural Order.—*Valerianaceæ.*

89. **Valerianæ Radix.** *Valerian Root.*

The dried root of Valeriana officinalis; that obtained from the wild plant is best.

Habitat.—Indigenous.

Characters.—Valerian root should be collected in autumn or early spring, when there is little growth above ground, for in proportion to the growth above ground is the loss to the root. Valerian root consists of a short rhizome with a number of rootlets attached to it; it has a strong, peculiar odour.

Composition.—Valerian root contains a volatile oil and valerianic acid. The volatile oil is believed not to pre-exist in the wood, but to be formed by the action of water.

Therapeutics.—Stimulant and antispasmodic.

Official Preparations.

Infusum Valerianæ.
Tinctura Valerianæ.
Tinctura Valerianæ Ammoniata.

Natural Order.—*Compositæ.*

90. **Pyrethri Radix.** *Pellitory Root.*

The root of Anacyclus Pyrethrum, or Pellitory of Spain.

Habitat.—Spain and Africa.

Characters.—Pellitory root occurs in pieces about the size of the little finger, breaking with a resinous fracture and exhibiting internally a radiated structure, by which it may be recognized.

Composition.—An acrid resin (pyrethrin) and a volatile oil.

Therapeutics.—A topical irritant.

Official Preparation.—Tinctura Pyrethri.

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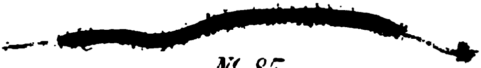

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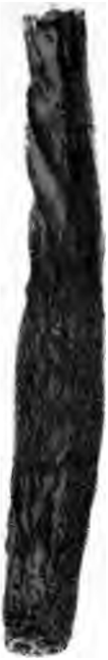

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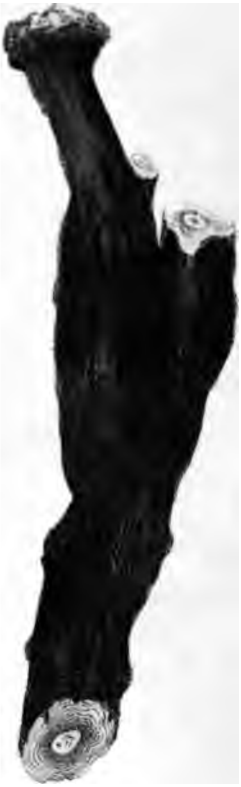

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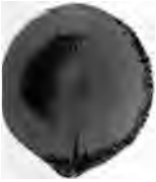

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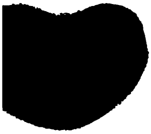

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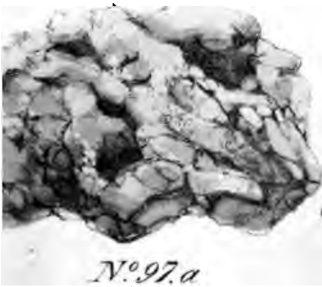

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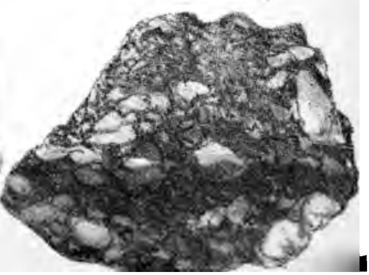

N° 97. b.

91. Santonica. *Santonica.*

The unexpanded flower-heads of Artemesia Maritima.
Habitat.—Russia.
Characters.—Santonica consists of the small unexpanded
itula or flower-heads ; they much resemble seeds in
earance, and hence have received the name of worm
d. Each flower-head consists of an external involucre,
posed of imbricated bracts ; within this are four or five
ular florets. There are three varieties of santonica :—

1. Levant or Russian Santonica.
2. Barbary Santonica.
3. Indian Santonica.

Only the Levant or Russian Santonica is official, as the
other kinds contain no santonin. The official variety
readily recognised by being smooth, the other kinds
ng hairy or downy on the surface.
Composition.—A volatile oil and a crystallizable substance
led santonin, to which it owes its active properties.
Therapeutics.—Anthelmintic.
Official Preparation.—Santoninum.

92. Anthemidis Flores. *Chamomile Flowers.*

The single and double flower-heads of Anthemis Nobilis.
Habitat.—Indigenous.
Characters.—The single chamomile flowers are composed
yellow tubular florets and white strap-shaped florets, the
mer constituting the disk and the latter the ray. The
ible chamomile flowers are composed of white strap-
ped florets only. The single flowers are the best, as
y possess the largest yellow disks, where most of the oil
des.
Description.—The circular green body at the base of each
ver-head is the involucre, composed of a number of
cts ; the conical body to which the florets are attached
he receptacle, and the little chaffy bodies found at the
e of each floret are small bracts called paleæ.
Adulterations.—Fever-few flowers, from Pyrethrum
thenium ; and the flowers of Matricaria Chamomilla

are used to adulterate chamomile flowers; the former are distinguished by their flat receptacle and no paleæ; the latter by the receptacle being hollow.

Composition.—A volatile oil, bitter extractive and tannic acid. The volatile oil, when fresh, is of a pale blue colour.

Therapeutics.—Stomachic and tonic.

Official Preparations.

Infusum Anthemidis.
Extractum Anthemidis.
Oleum Anthemidis.

93. **Taraxaci Radix.** *Dandelion Root.*

The fresh and dried roots of Taraxacum Dens Leonis, the common Dandelion. To be collected between September and February.

Habitat.—Indigenous.

Characters.—Care should be taken not to collect the roots after a frost, as they then lose their bitterness. A section of dandelion root shows a number of concentric rings (laticiferous vessels) arranged round a yellow disk; by these characters it may at once be distinguished from any adulterations.

Composition.—The juice, which is the active portion, contains a bitter extractive (taraxacin); the juice resides entirely in the laticiferous vessels.

Therapeutics.—An alterative in liver complaints.

Official Preparations.

Decoctum Taraxaci.
Extractum Taraxaci.
Succus Taraxaci.

94. **Arnicæ Radix.** *Arnica Root.*

The rhizome and rootlets of Arnica Montana.

Habitat.—Mountainous parts of Europe and Asia.

Characters.—Arnica consists of a small rhizome, 1 to 2 inches long, with a number of slender rootlets attached. Arnica flowers, which are used on the Continent, are far more efficacious than the root.

nposition.—A volatile oil and an acrid resin.
rapeutics.—Used externally for bruises.
cial Preparation.—Tinctura Arnicæ.

NATURAL ORDER.—*Lobeliaceæ.*

95. **Lobelia.** *Lobelia.*

e flowering herb of Lobelia Inflata.
bitat.—United States (North America.)
racters.—Lobelia generally comes over in the form of ressed cakes which consist of the entire herb.
nposition.—Lobelia contains a volatile oil, resin, and a alkaloid lobeline.
rapeutics.—Expectorant and diaphoretic.

Official Preparations.

Tinctura Lobeliæ.
Tinctura Lobeliæ Ætherea.

NATURAL ORDER.—*Ericaceæ.*

96. **Uvæ Ursi Folia.** *Bearberry Leaves.*

leaves of Arctostaphylos Uva Ursi.
bitat.—Grown in England.
racters.—Bearberry leaves are small, dark-green in , leathery in consistence, and have an entire margin.
lterations.—Red Whortleberry leaves and box leaves ed to adulterate Bearberry leaves.
Whortleberry leaves have a crenate margin.
rberry leaves have an entire margin.
leaves are destitute of astringency.
rberry leaves are very astringent.
position.—Bearberry leaves owe their activity to acid, of which they contain about 36 per cent.; lso contain a volatile oil and 2 substances called and Arbutin.
rapeutics.—Astringent and diuretic.
cial Preparation.—Infusum Uvæ Ursi.

NATURAL ORDER.—*Styraceæ.*

97. Benzoinum. *Benzoin.*

A balsamic resin obtained from Styrax Benzoin.

Habitat.—Siam and Sumatra.

Collection.—Benzoin is obtained by making incisions in the bark and exposing the exuded liquid to the air.

Characters.—Two kinds of Benzoin are known in commerce, Siam Benzoin and Sumatra Benzoin.

Siam Benzoin (97), which is the best kind, occurs in tears, or in lumps consisting of agglutinated tears, which, when broken, present an amygdaloid appearance.

Sumatra Benzoin (97*a*), which is an inferior kind, occurs in pieces with the impression of a cloth on them; the pieces are not made up of large tears but of small fragments, so that when broken, they present no amygdaloid appearance, but the whole looks like red granite.

There are also three varieties of Benzoin called Head, Belly, and Foot Benzoin.

1. Head Benzoin (the best) is white, and is that which exudes during the first three years.
2. Belly Benzoin is of a brownish colour, and is that which flows after the first three years.
3. Foot Benzoin is obtained by cutting down the tree, splitting the stem and scraping out the balsam; it is very impure.

Composition.—Benzoin contains from 15 to 20 per cent. of Benzoic acid, and 80 per cent. of resin.

Therapeutics.—A stimulant and expectorant.

Official Preparations.

Adeps Benzoatus.
Acidum Benzoicum.
Tinctura Benzoini Composita.

NATURAL ORDER. *Oleaceæ.*

98. Manna. *Manna.*

A concrete saccharine exudation from the stem of Fraxinus Ornus and Fraxinus Rotundifolia.

Habitat.—Cultivated in Sicily and Calabria.

Characters.—Manna is obtained by making transverse isions in the bark, when it exudes and is allowed to dry. Two varieties of Manna are known in commerce :—

1. Flake Manna. 2. Manna in sorts.

1. Flake Manna. Obtained during the height of the son, from the upper part of the stem, where the juice less fatty and dries quicker. It is the best kind.

2. Manna in Sorts. Obtained from the lower part of stem, where the juice is more fatty and takes longer to y. It is an inferior kind.

Manna is flat on that side which has adhered to the stem; opposite side is irregular.

Composition.—Manna contains 60 to 80 per cent. of nnite, extractive matter, and a small amount of resin.

Therapeutics.—A mild laxative.

NATURAL ORDER.—*Asclepiadaceæ.*

99. **Hemidesmi Radix.** *Hemidesmus Root.*

The root of Hemidesmus Indicus, called Indian Sarsarilla.

Habitat.—India.

Characters.—In yellowish-brown long cylindrical pieces; e cortical portion is wrinkled, marked with deep circular gs, and looks as if it were too large for the meditullium.

Composition.—Hemidesmus root contains a substance lled hemidesmine, of which little is known.

Therapeutics.—Supposed to have a similar action to that sarsaparilla.

Official Preparation.—Syrupus Hemidesmi.

NATURAL ORDER.—*Loganiaceæ.*

100. **Nux Vomica.** *Nux Vomica.*

The seeds of Strychnos Nux Vomica.

Habitat.—East Indies and Ceylon.

Characters.—Nux Vomica seeds are round, concave on e side and convex on the other; externally they are covered by a testa composed of fine satiny hairs. In t centre of the concave side is a little mark (the hilum); fr the hilum is a little ridge (the raphe), terminating in little protuberance at the circumference of the seed (t chalaza). The Nux Vomica seeds are albuminous, the bumen being horny and of a dirty white colour. When sp open the plumule and radicle can be distinctly seen, t plumule resembling a small ovate leaf.

Composition.—Nux Vomica seeds contain two alkaloi strychnia and brucia; from ½ to 1 per cent. of strychnia present. Both alkaloids exist in the seeds in combinati with igasuric acid. Brucia has been stated not to be distinct alkaloid, but a compound of strychnia and res The poisonous properties of Nux Vomica bark are due brucia.

Therapeutics.—A powerful stimulant and bitter stomach in large doses poisonous.

Official Preparations.

Extractum Nucis Vomicæ.
Tinctura Nucis Vomicæ.
Strychnia.

(Not Official.)

101. **Faba Sancti Ignatii.** *St. Ignatius' Bean.*

The seed of the Strychnos Amara.

Habitat.—Phillippine Islands.

Characters.—The seeds are of a brown colour, somewh triangular in shape and of a horny texture.

Composition.—These seeds are used as a source strychnia, of which they contain about 1·5 per cent. Th also contain brucia.

Therapeutics.—The same as Nux Vomica.

NATURAL ORDER.—*Gentianaceæ.*

102. **Gentianæ Radix.** *Gentian Root.*

The dried root of Gentiana Lutea.

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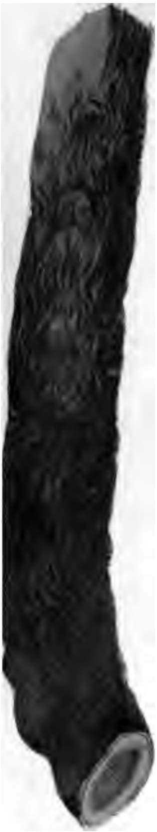

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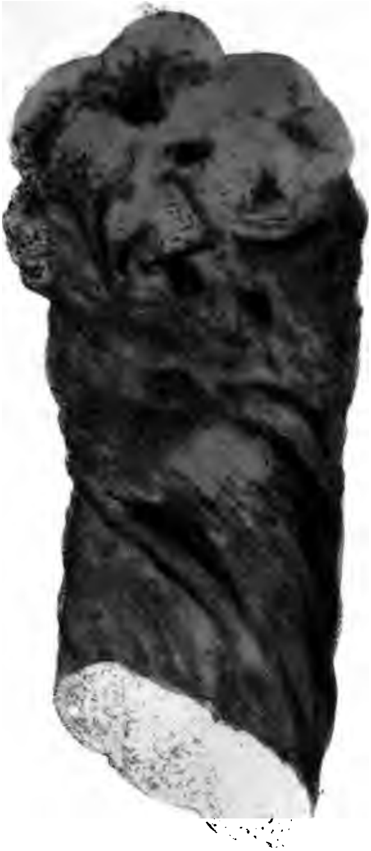

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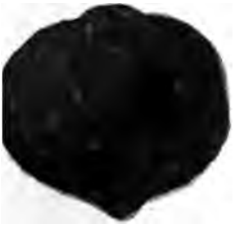

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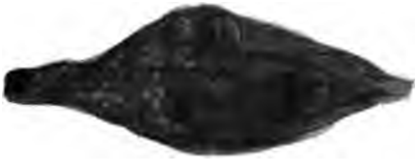

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Habitat—Mountainous parts of Central and Southern Europe.

Characters.—Gentian root occurs in cylindrical pieces, of a yellowish brown colour, and spongy within. This root may be recognised by its being divided into three parts.

1. A large central meditullium portion.
2. A deep red line encircling it.
3. A yellow cortical portion outside.

Composition.—Gentian root contains a bitter principle, gentianite, gentisic acid, and pectin.

Therapeutics.—A stomachic tonic.

Official Preparations.

Extractum Gentianæ.
Infusum Gentianæ Compositum.
Mistura Gentianæ.
Tinctura Gentianæ Composita.

103. Chirata. *Chiretta.*

The entire plant, Ophelia Chirata.

Habitat.—India.

Characters.—Chiretta is imported in bundles about 3 feet long; the stems are of a brown colour, and have the flowers and parts of the roots attached. Any part of the plant is intensely bitter to the taste.

Adulteration.—An adulteration of Chiretta has lately been described; it is the Munjeet plant, derived from Rubia Cordifolia; it may be distinguished by being a trailing plant.

Composition.—A bitter matter, chiratin, to which it owes its active properties.

Therapeutics.—A stomachic tonic.

Official Preparations.

Infusum Chiratæ.
Tinctura Chiratæ.

NATURAL ORDER.—*Convolvulaceæ.*

104. Scammoniæ Radix, *Scammony Root.*

The dried root of Convolvulus Scammonia.

Habitat.—Asia Minor.

Characters.—A twisted root of a light colour. It is official for extracting resin of scammony from it.

Composition.—4 per cent. of resin, 6 per cent. of gum. Scammony roots are richest in resin just before the plants flower.

Official Preparation.—Scammoniæ Resina.

105. Scammonium. *Scammony.*

A gum-resin obtained from the living root of Convolvulus Scammonia.

Collection.—Scammony is obtained by making incisions in the living root, and sticking a mussel shell in the root just below the incision. The scammony exudes and runs down into the shell; the contents of several shells are then scraped out, mixed together, and dried.

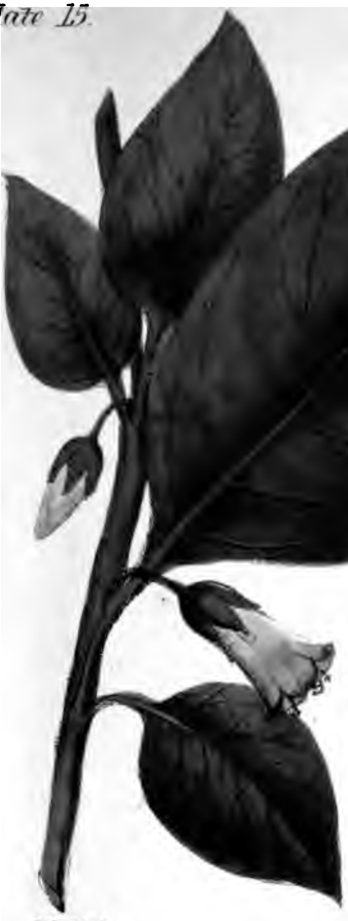
Characters.—Scammony is sometimes covered externally with chalk, to prevent the lumps sticking together. When broken, if good, it should present a greenish black shining resinous fracture, with no white spots; when moistened with water it forms an emulsion, due to the suspension of the resin in the dissolved gum.

Adulterations.—Chalk, starch, guaiacum resin, earthy matter. When a lump of scammony is touched internally with hydrochloric acid, it should not effervesce, showing absence of chalk. A cold decoction of scammony should not turn blue on the addition of iodine, indicating absence of starch. Guaiacum resin can be delicately detected by making a tincture of the scammony with spirit, and adding solution of chlorinated lime; a blue colour will be produced if any guaiacum be present. Earthy matter can be detected by estimating the amount of ash left on burning a weight of the scammony; good scammony should contain only 3 per cent. of ash.

Scammony resin is sometimes adulterated with jalap resin. Scammony resin is entirely soluble in ether; jalap resin is not.

Composition.—A sample of Scammony is good if it has

Plate 15.



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the following composition :—80 per cent. of resin, 6 to 8 per cent. of gum, 3 per cent. of ash; the remainder is moisture.

Therapeutics.—A drastic purgative.

Official Preparations.

Confectio Scammonii.
Pulvis Scammonii Compositus.

106. **Jalapa.** *Jalap.*

The dried tubercules of Exogonium Purga.

Habitat.—Mexico.

Characters.—The tubercules are the swollen portions of the roots ; they are rounded, more or less pointed at the extremities, heavy in weight, dense in structure, and resinous in appearance. The pieces are sometimes worm-eaten ; worm-eaten jalap contains less resin than sound jalap. The official jalap is known in commerce as Vera Cruz jalap.

Adulterations.—Tampico Jalap obtained from Ipomæa Simulans, is an adulteration of true jalap ; it is more wrinkled, lighter in weight and more elongated than the true jalap.

The root of Ipomæa Orizabensis is another adulteration of jalap ; it is paler in colour and lighter in weight than the true jalap.

Composition.—Jalap contains 18 per cent. of resin, to which it principally owes its active properties, and extractive matter.

Therapeutics.—A brisk purgative.

Official Preparations.

Extractum Jalapæ.
Pulvis Jalapæ Compositus.
Tinctura Jalapæ.

NATURAL ORDER.—*Solanaceæ.*

107. **Dulcamara.** *Dulcamara.*

The young branches, dried, of Solanum Dulcamara, collected in autumn, when the plants have shed their leaves.

Habitat.—Indigenous.

Characters.—Dulcamara occurs in small cylindrical pieces, one to two inches long, very light in weight on account of their containing much pith.

Composition.—An alkaloid solania, to which the active properties are due.

Therapeutics.—Alterative.

Official Preparation.—Infusum Dulcamaræ.

108. **Capsici Fructus.** *Capsicum Fruit.*

The dried ripe fruit of Capsicum Fastigiatum; called Guinea and pod pepper.

Habitat.—Zanzibar.

Characters.—A small pod, with a shrivelled appearance, ½ to 1 inch long, of a bright scarlet colour and possessing a very pungent odour. The pods powdered constitute cayenne pepper.

Composition.—An acrid resin and an oil, capsicine.

NATURAL ORDER.—*Atropaceæ.*

109. **Belladonnæ Folia.** *Belladonna Leaves.*

The fresh leaves and branches of Atropa Belladonna, or deadly nightshade; also the dried leaves separated from the branches; to be gathered when the fruit has begun to form.

110. **Belladonnæ Radix.** *Belladonna Root.*

The dried root of Atropa Belladonna.

Habitat.—Cultivated in England.

Characters.—Belladonna root occurs in pieces from 1 to 2 feet long, from ½ to 2 inches thick, of a brownish white colour. It is sometimes mistaken for gentian root, but the difference in colour and the peculiar structure of gentian root (see gentian root) will at once distinguish them. Preparations of Belladonna possess the property of dilating the pupil of the eye.

Composition.—Both leaves and root contain the alkaloid atropia, to which they owe their activity; it exists in the plant as acid malate of atropia. The root is more powerful than the leaves.

Therapeutics.—An antispasmodic.

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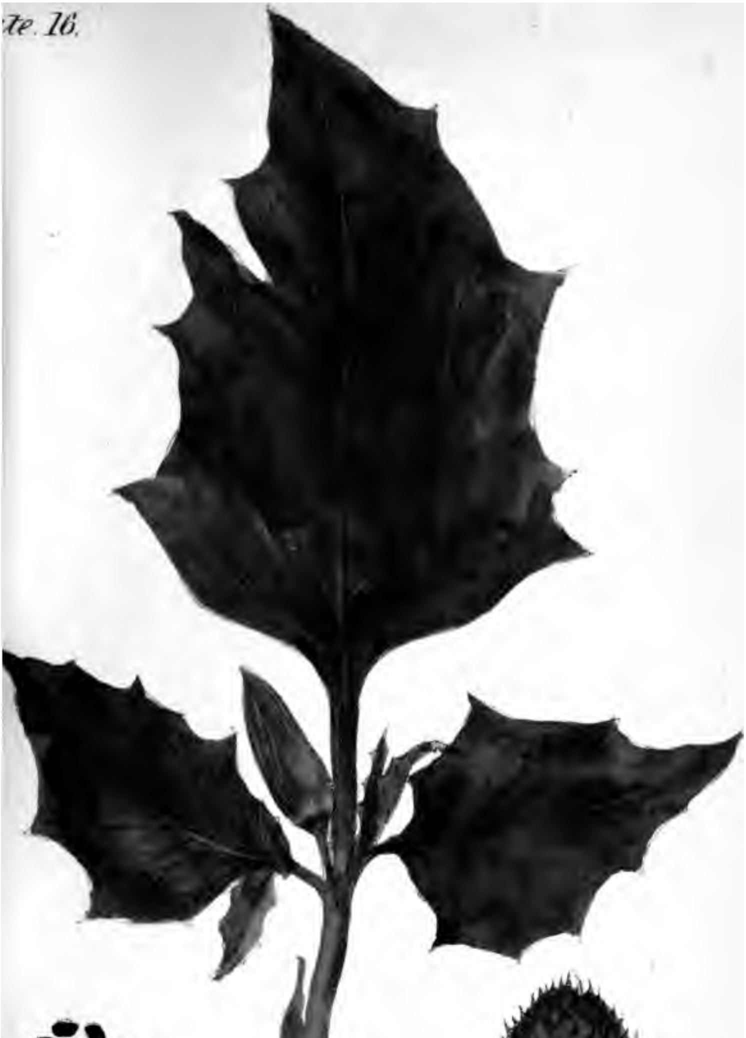

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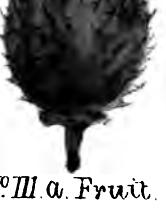


No. 111. a. Fruit.

Official Preparations.

Of the leaves	Extractum Belladonnæ Emplastrum Belladonnæ. Tinctura Belladonnæ. Unguentum Belladonnæ.
Of the root	Atropia. Linimentum Belladonnæ.

111. Stramonii Folia. *Stramonium Leaves.*

The dried leaves of Datura Stramonium, the Thorn Apple.

112. Stramonii Semina. *Stramonium Seeds.*

The ripe seeds of Datura Stramonium.

Habitat.—Indigenous.

Composition.—The leaves and seeds contain an alkaloid daturine, which is identical in composition and properties with atropine.

Therapeutics.—The same as belladonna.

Official Preparations.

Of the seeds	Extractum Stramonii. Tinctura Stramonii.

112a. Tabaci Folia. *Leaf Tobacco.*

The dried leaves of Virginian Tobacco, Nicotiana Tabacum

Habitat.—North America.

Composition.—The active principle of tobacco is due to a volatile alkaloid, *nicotine.*

Official Preparation.—Enema Tabaci.

113. Hyoscyami Folia. *Henbane Leaves.*

The fresh leaves and young branches, and the dried leaves of Hyoscyamus Niger, the Henbane plant; to be gathered from biennial plants, when about two-thirds of the flowers are expanded.

Habitat.—Indigenous.

Characters.—When fresh the leaves are green and hairy. The leaves of the annual and biennial plants may be distinguished by the former being sessile and the latter stalked; moreover a tincture of the leaves of the annual plants remains clear when mixed with water; a tincture of the leaves of the biennial plants produces a milkiness when mixed with water.

Composition.—The active properties are due to an alkaloid hyoscyamine, which can be distilled without decomposition, and may be distinguished from atropia by its being soluble in water. Henbane juice dilates the pupil of the eye.

Therapeutics.—The same as belladonna, but milder in its action.

Official Preparations.

Of the fresh leaves Extractum Hyoscyami.
Of the dried leaves Tinctura Hyoscyami.

NATURAL ORDER.—*Scrophulariaceæ.*

114. Digitalis Folia. *Digitalis Leaves.*

The dried leaves of Digitalis purpurea, the Purple Foxglove; collected when about two-thirds of the flowers are expanded.

Habitat.—Indigenous.

Characters.—Digitalis leaf is ovate lanceolate in shape, it has a crenate margin, and is downy on the under surface.

Adulterations.—Mullein leaves obtained from Verbascum Thapsus are used to adulterate digitalis leaves, they may be distinguished by being downy upon both surfaces. The Inula Conyza are sometimes found mixed with digitalis leaves, they are rougher than digitalis leaves, and possess a fetid odour.

Composition.—Digitalis leaves owe their activity to a neutral principle called digitalin.

Therapeutics.—A cardiac sedative.

Official Preparations.

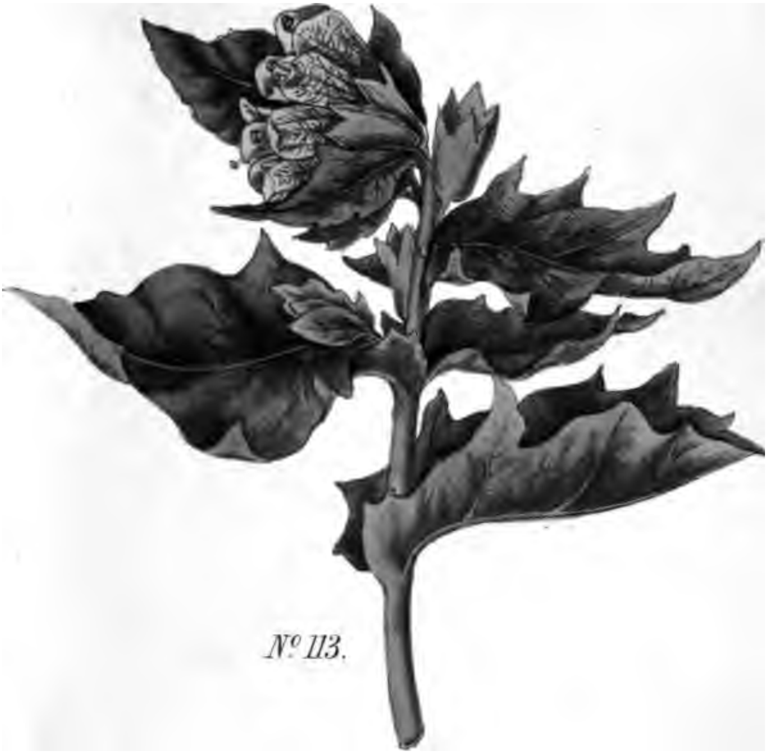
Digitalinum. Infusum Digitalis. Tinctura Digitalis.

NATURAL ORDER.—*Labiatæ.*

The following oils, obtained from plants belonging to this order, are official.

Oil of Rosemary	obtained from	Rosmarinus officinalis.
Oil of Lavender	,,	Lavandula vera.
Oil of Peppermint	,,	Mentha piperita.
Oil of Spearmint	,,	Mentha viridis.

Plate 17.



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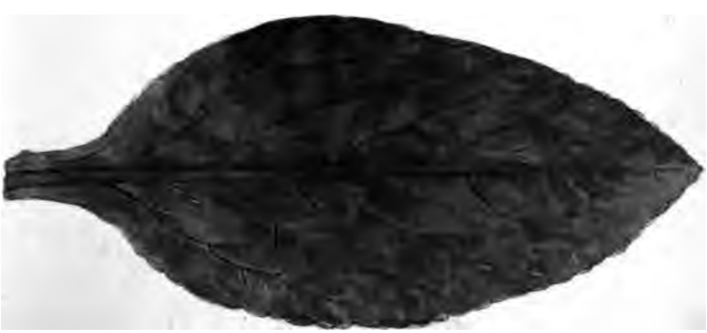

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Case D.

SUB-CLASS.—**Monochlamydeæ.**

NATURAL ORDER.—*Polygonaceæ.*

Rhei Radix. *Rhubarb Root.*

The dried root, deprived of the external portion, of Rheum officinale.

Habitat.—Chinese Tartary and Thibet.

Collection.—The roots are dug up when the plant is six years old (if younger, the root is of a pale colour, from the active properties not being developed), the cortical portion is then removed either by scraping or slicing, and the roots are dried by exposure to the air; frequently a hole is bored through the pieces. which are then strung upon a string to dry.

Characters.—Though there is no true Turkey Rhubarb in commerce now, yet that rhubarb which is sent overland to Moscow, is known as Turkey or Russian rhubarb. All rhubarbs coming by way of Russia or India may be used in the official preparations. The official rhubarbs are the Turkey or Russian, the East Indian, and the Dutch-trimmed.

The English and Himalayan rhubarbs must not be used in the official preparations.

The following characters will distinguish the different rhubarbs.

115a. Turkey or Russian Rhubarb.

Trimmed by being sliced, so that the root presents flat surfaces and angles; on account of the slicing no portions of the cortex are left on the pieces. Large hole. Mottled texture. Reticulated veins.

115b. East Indian Rhubarb.

Trimmed by being scraped, therefore it has a rounded surface, and brown portions of the cortex left on it. Small hole. Reticulated veins. On the finer pieces are star-like spots.

115c. Dutch Trimmed Rhubarb.

This kind may be recognised by the irregular appearance the pieces present, looking as though they had been cut out of a root, or large pieces cut out of them. Reticulated veins.

115d. English Rhubarb.

Spongy, of a pinkish hue. Veins parallel, and therefore present a radiating appearance when a piece is cut across. This rhubarb contains no raphides (crystals of oxalate of calcium), and therefore is not gritty when chewed. The three previously mentioned rhubarbs all contain raphides, and feel gritty when chewed.

Adulteration.—Rhubarb is frequently adulterated with English rhubarb, which is derived from Rheum Rhaponticum; it may be detected by the characters just given. Powdered rhubarb is sometimes adulterated with turmeric; to detect this, prepare a weak tincture of the rhubarb, and add solution of boracic acid to it, if it turns deep brown, turmeric is present.

Composition.—Rhubarb contains chrysophanic acid, three resins, a bitter extractive and about 40 per cent. of oxalate of calcium (raphides), the combined action of these bodies produces the activity of rhubarb.

Therapeutics.—Stomachic in small doses; purgative in large doses.

Official Preparations.

Extractum Rhei.
Infusum Rhei.
Pilula Rhei Composita.
Pulvis Rhei Compositus.
Syrupus Rhei.
Tinctura Rhei.
Vinum Rhei.

NATURAL ORDER. *Myristicaceæ.*

116. Myristica. *Nutmeg.*

The kernel of the seed of Myristica Officinalis.

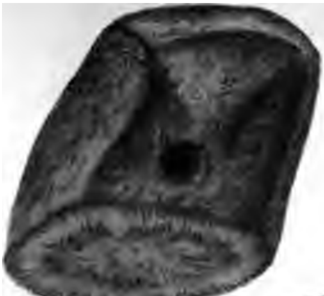
Fig. 116*a.* shows the entire fruit.

Fig. 116*b.*, the seed before the mace or arillode has been removed.

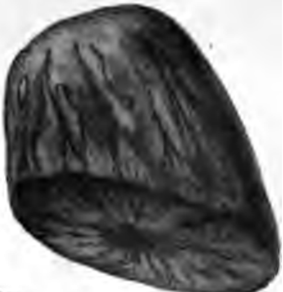
Fig. 116*c.* section of ditto, shewing the kernel, or nutmeg.

Habitat.—The Banda Islands of the Malayan Archipelago.

Plate 19.



Nº 115. a.



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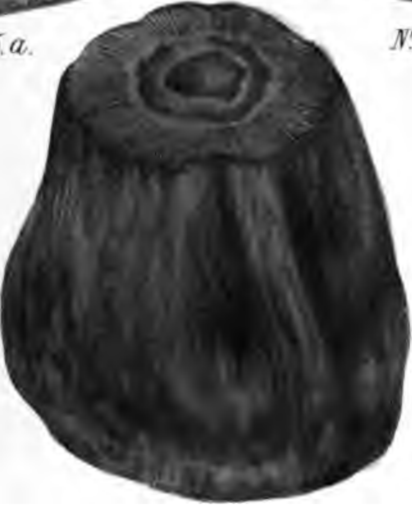

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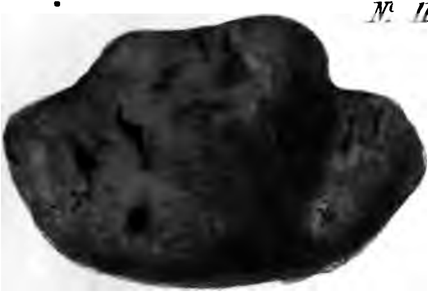
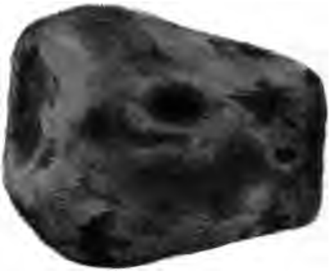


Nº 115. c.



Nº 115. b.

Characters.—The nutmeg is of the shape of a bird's egg, about an inch long, and presenting, when cut, a mottled or veined appearance, this is due to the endopleura or inner coat of the seed penetrating into the albumen and branching in all directions ; such albumen is called ruminated.

Four kinds of nutmegs occur in commerce.

1.—Penang nutmegs. These are the best ; they are not coated over with lime.
2.—Dutch, or Batavian nutmegs. Coated over with lime to preserve them.
3.—Singapore nutmegs. An inferior kind.
4.—Long nutmegs. An inferior kind obtained from Myristica fatua.

Mace is a covering on the outside of the testa of the seed ; it is an arillode or false arillus (not an aril).

Mace is frequently soaked in solution of salt to prevent the attacks of insects.

Composition.—A volatile oil and a fixed concrete oil, about 30 per cent. of the latter is contained in nutmegs.

Therapeutics.—An aromatic carminative.

Official Preparations.

Myristicæ Oleum Expressum.
Oleum Myristicæ.
Of the volatile oil Spiritus Myristicæ.

NATURAL ORDER.—*Lauraceæ.*

117. Cinnamomi Cortex. *Cinnamon Bark.*

The inner, or liber bark of shoots from the truncated stocks of Cinnamomum Zeylanicum ; known in commerce as Ceylon cinnamon.

Habitat.—Ceylon (South of India).

Characters.—Cinnamon is the liber bark, and has the two outer layers of the bark (epiphlæum and mesophlæum) removed ; it occurs in commerce in the form of compound quills, which are prepared by inserting the smaller quills within the larger ones.

Adulteration.—Cassia bark, the produce of Cinnamomum Cassia (117*a*) is used to adulterate cinnamon bark ; the quills are larger, thicker, and single (not filled up). If powdered cassia bark is used to adulterate cinnamon bark in powder, it may be detected by making a decoction, and when cold adding tincture of iodine. a blue colour, will indicate the presence of cassia bark, on account of its containing starch; cinnamon bark also contains starch, but it exists as tannate of starch, which will not give the blue colour with iodine.

Composition.—A volatile oil and tannic acid.

Therapeutics.—An aromatic stimulant and carminative.

Official Preparations.

Aqua Cinnamomi.
Oleum Cinnamomi.
Pulvis Cinnamomi Compositus.
Tinctura Cinnamomi.

(Not official.)

118. Cassia Buds.

The dried flower buds of Cinnamomum Cassia.

These to some extent resemble cloves in appearance; but a close inspection will at once distinguish them.

119. Camphora. *Camphor.*

A concrete volatile oil obtained from the wood of Camphora Officinarum.

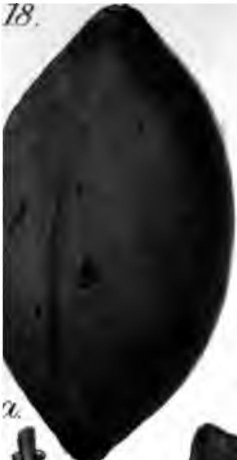
Habitat.—China and Japan.

Extraction.—The leaves, twigs, wood, &c. of the camphor tree are boiled with water until the camphor begins to solidify on a branch used to stir the liquid with; it is then allowed to cool, when the camphor solidifies and floats; in this form it is sent to England and is then sublimed in the form of hollow hemispherical cakes.

Characters.—Camphor is a white solid, slightly soluble i water, readily soluble in alcohol; it is difficult to powde by itself, but when a few drops of spirit are added it ca easily be powdered.

Adulterations.—Camphor is seldom adulterated. Anothe kind of camphor, in the form of small pieces or grains, i occasionally met with; it is called Borneo camphor, and i the produce of Dryobalanops aromatica. This kind i

18.



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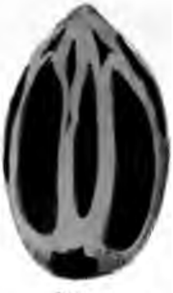

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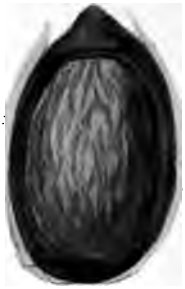

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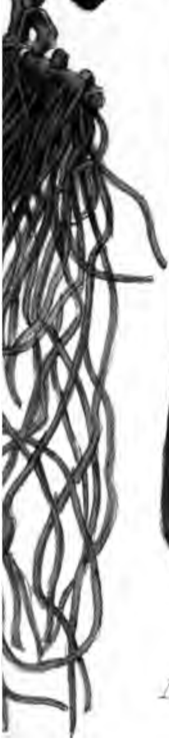

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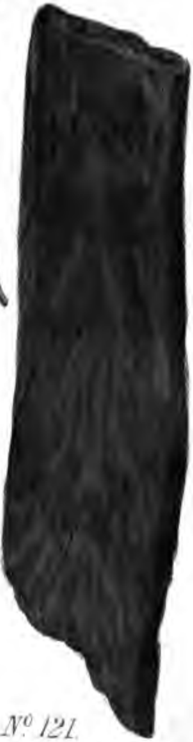

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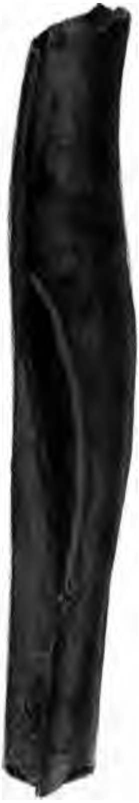

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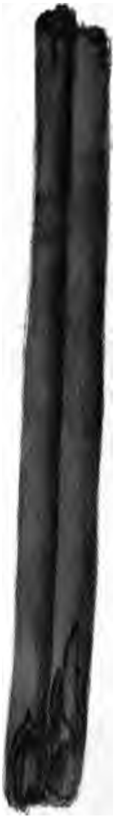
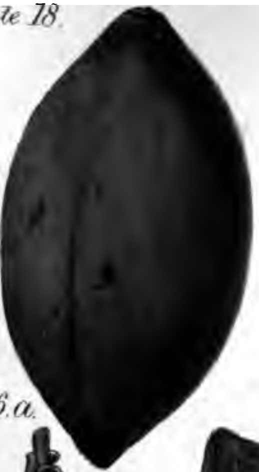


N° 117.

Plate 18.



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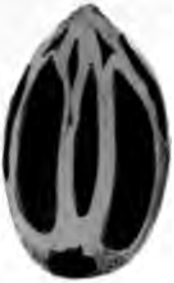

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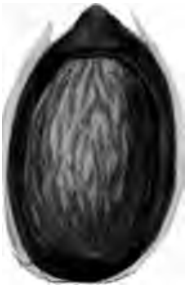

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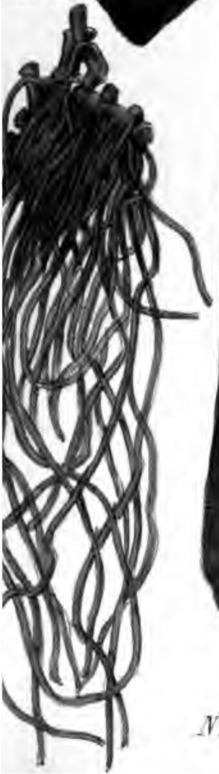

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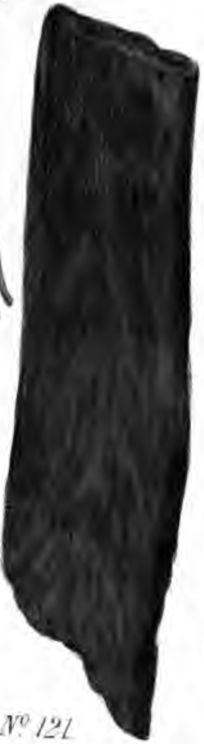

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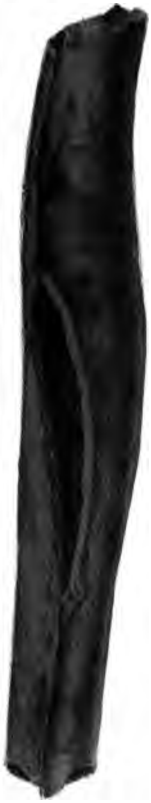

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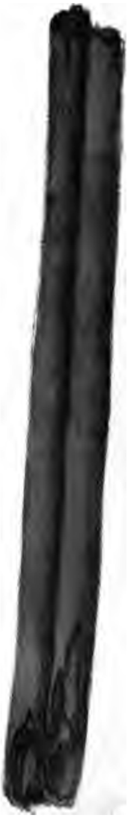


No. 117.

Therapeutics.—A stimulant and diuretic.

Official Preparations.

Infusum Serpentariæ.
Tinctura Serpentariæ.

NATURAL ORDER.—*Thymelaceæ.*

123. **Mezere Cortex.** *Mezereon Bark.*

The dried bark of Daphne Mezereum, or of Daphn Laureola.

Habitat.—Indigenous.

Characters.—The bark from both root and stem is officia That obtained from Daphne Mezereum is the best, but is t most difficult to obtain; the bark of Daphne Laureola chiefly found in commerce.

Composition.—An acrid resin, a volatile oil, and a pri ciple called daphnin.

Therapeutics.—Externally a local irritant; internally diaphoretic and diuretic.

Official Preparation.—Extractum Mezerei Æthereum.

NATURAL ORDER.—*Euphorbiaceæ.*

124. **Cascarillæ Cortex.** *Cascarilla Bark.*

The bark of Croton Eluteria.

Habitat.—The Bahama Islands.

Characters.—In small quills about the size of a penc with a number of black spots on the outer surface; t quills are covered with white lichens.

Composition.—A volatile oil, resin, and extractive matt

Therapeutics.—Stomachic and tonic.

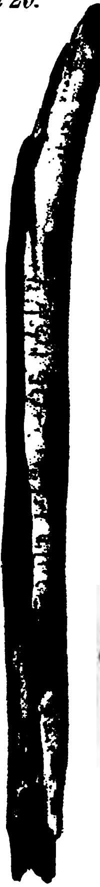
Official Preparations.

Infusum Cascarillæ.
Tinctura Cascarillæ.

125. **Crotonis Semina.** *Croton Seed.*

Croton seeds from which the oil is expressed are rat smaller than castor oil seeds, of a brown colour externa

late 20.



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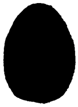

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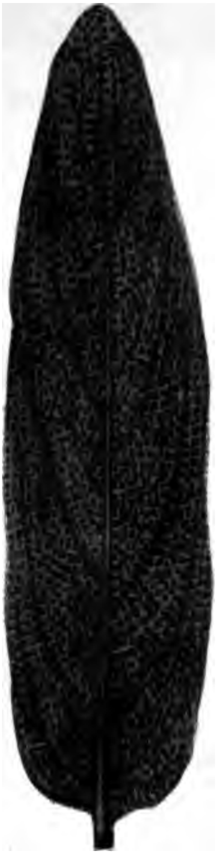

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№ 133.(2)

№ 131.

and triangular in shape. They consist of 64 parts of nucleus to 36 parts of shell; the nucleus contains 60 per cent. of oil.

Habitat.—East Indies.

Two kinds of croton oil are known in commerce, that expressed in England and that expressed abroad.

1. English oil is of a reddish brown colour, and fluorescent to a green colour; it is soluble in cold alcohol.

2. Foreign oil is lighter in colour than the English, and is insoluble in cold alcohol.

Composition.—The seeds contain the fixed oil, crotonic acid, and crotonin.

Therapeutics.—A drastic purgative.

126. **Ricini Semina.** *Castor Oil Seed.*

The seeds from which the oil is expressed are about the size of small beans, the testa is mottled, and at one part of the seed is a small protuberance (*a*), which is called the caruncule or strophiole. Castor oil differs from most other fixed oils in being soluble in alcohol, and also possesses the property of rendering other oils which are insoluble in alcohol, when mixed with it, soluble. Cold-drawn castor oil is the oil expressed without the aid of heat.

Habitat.—East Indies; cultivated in Italy.

127. **Kamala.** *Kamala.*

A powder consisting of the minute glands covering the capsules of Rottlera Tinctoria.

Habitat.—India.

Characters.—Kamala is a powder of a brick-red colour, with a lighter coloured powder intermixed. This latter is the outer portion of the pericarp; it should be separated. This can be done by shaking, when, on account of the different specific gravities of the two, the heavier falls to the bottom.

Composition.—Kamala contains a resinous body called ottlerine.

Therapeutics.—A powerful anthelmintic.

NATURAL ORDER.—*Piperaceæ.*

128. **Piper Nigrum.** *Black Pepper.*

The dried unripe berries of Piper Nigrum.

Habitat.—East Indies.

Characters.—Black pepper consists of the whole unripe fruit, picked when the berries are changing from a green to a red colour. White pepper is obtained from the same plant, but it consists of the ripe fruit with most of the pericarp rubbed off; in fact, white pepper consists of little more than the ripe seed.

Composition.—Resin, volatile oil, and piperine.

Therapeutics.—A stimulant stomachic; chiefly used as a condiment.

Official Preparation.—Confectio Piperis.

129. **Cubeba.** *Cubeba.*

The dried unripe fruit of Cubeba Officinalis.

Habitat.—Java.

Characters.—The cubeb fruit very much resembles black pepper, but can be readily distinguished by having a small stalk attached; on this account it has received the name of tailed pepper.

Composition.—A volatile oil, resin, and cubebin.

Therapeutics.—Cubebs are principally used for their influence on the mucous membrane of the urethra and bladder.

Official Preparations

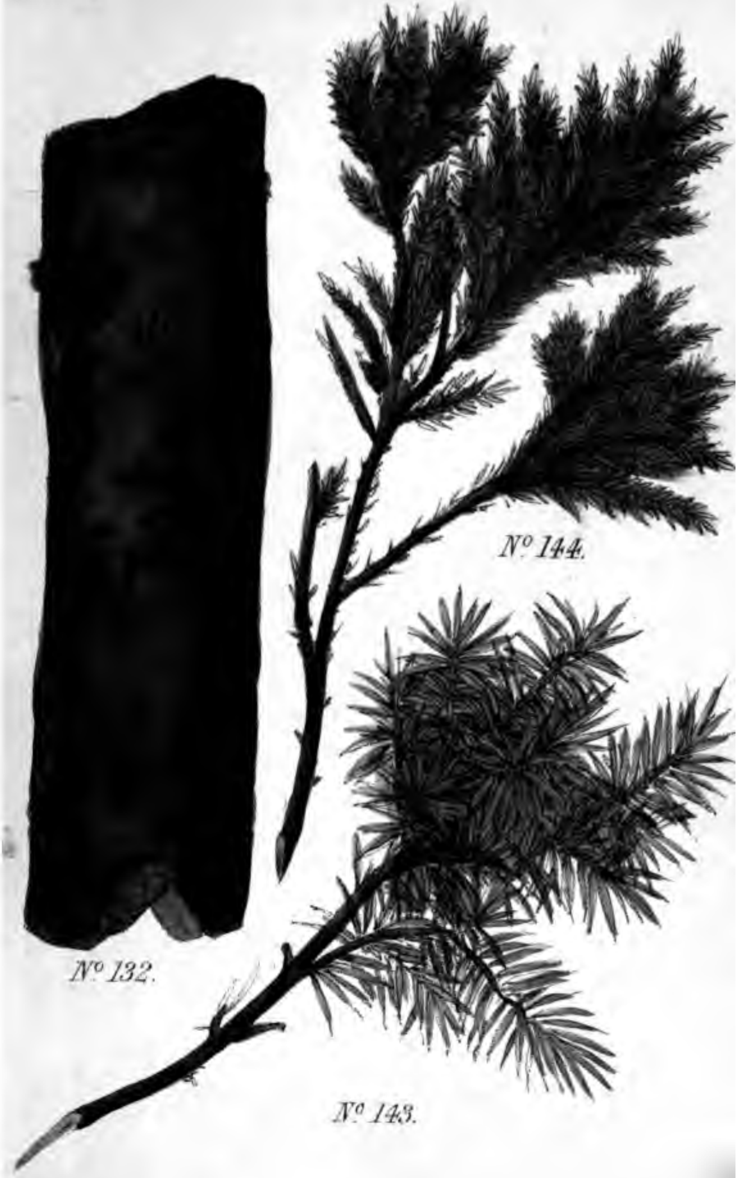
Oleum Cubebæ.
Tinctura Cubebæ.

130. **Maticæ Folia.** *Matico Leaves.*

The leaves of Artanthe Elongata.

Habitat.—Peru.

Plate 21.



No. 144.

No. 132.

No. 143.

Characters.—Matico leaves have a green colour; they are lanceolate in shape and downy on the under surface. The veins are reticulated and project out a great deal.

Adulteration.—The leaves of Artanthe Adunca. The veins are not so projecting, and there are fewer hairs.

Therapeutics.—Chiefly used as a styptic.

Official Preparation.—Infusum Maticæ.

NATURAL ORDER.—*Ulmaceæ.*

131. **Ulmi Cortex.** *Elm Bark*

The dried inner or liber bark of Ulmus Campestris.

Habitat.—Indigenous.

Elm bark should be collected in spring, and the outer bark must be removed.

Composition.—A substance called ulmin, and 3 per cent. of tannic acid.

Official Preparation.—Decoctum Ulmi.

NATURAL ORDER.—*Cupuliferæ.*

132. **Quercus Cortex.** *Oak Bark.*

The dried bark of the small branches and young stems of Quercus Pedunculata.

Habitat.—Indigenous.

Characters.—Oak bark occurs in long pieces, generally covered with a grey epidermis, astringent to the taste. It should be collected in spring, as it is most astringent at that period.

Composition.—Oak bark contains 6 to 10 per cent. of tannic acid.

Therapeutics.—Astringent.

Official Preparation.—Decoctum Quercus.

133. **Galla.** Galls.

Excrescences occurring on the small twigs of Quercus Infectoria, the gall oak, caused by the punctures and deposited ova of Diplolepis Gallæ tinctoriæ.

Habitat.—Asia Minor.

Characters.—After the puncture of the young twig by the insect, an astringent exudation takes place, which encloses the eggs deposited by the insect; when dry, this exudation constitutes the gall. When a hole is found in a gall, it is caused by the insect (produced from one of the eggs) having eaten its way out and escaped. The best galls are those without holes.

There are two varieties of galls, blue and white.

1. Blue or Aleppo galls are small, heavy, of a bluish green colour externally, without a hole, and possessing internally a cavity containing the dried-up insect.
2. White galls are larger and lighter both in colour and weight; they frequently have a hole, as they are gathered when the insect has escaped.

Composition.—Good galls contain 40 per cent. of tannic acid, and about 4 per cent. of gallic acid.

Therapeutics.—Astringent.

Official Preparations.

Acidum Tannicum.
Acidum Gallicum.
Tinctura Gallæ.
Unguentum Gallæ.
Unguentum Gallæ cum Opio.

NATURAL ORDER.—*Liquidambaraceæ.*

134. **Styrax Preparatus.** *Prepared Storax.*

A liquid balsam, obtained by expression or by ebullition with water, from the bark of Liquidambar Orientale; purified by means of rectified spirit and straining.

Habitat.—Asia Minor.

Characters.—Storax occurs in two forms, the liquid and solid.

1. Liquid storax is the official storax. It is a thick sticky substance of the consistence of bird lime.
2. Solid or common storax consists of the liquid made into lumps with the powdered residual bark or with sawdust.

Composition.—A volatile oil, cinnamic acid, styracin, and resins. Storax is a true balsam, since it contains cinnamic acid.

Therapeutics.—Same as with Balsams of Peru and Tolu.

NATURAL ORDER —*Cannabinaceæ.*

135. **Cannabis Indica.** *Indian Hemp.*

The dried flowering tops of the female plants of Cannabis Sativa, to be collected from plants grown only in India.

Habitat.—India.

Characters.—The tops are branched, and have on them a few leaves, some ripe fruits, and the remains of the flowers. The resinous exudation from the plant is called "churrus."

Composition.—A resin called cannabin and extractive matter. The resin is not secreted in plants grown in England; and, as the active properties are due to the resin, the tops are to be gathered from plants grown in India, where, on account of different soil and climate, the resin is secreted.

Therapeutics.—Indian hemp possesses antispasmodic and anodyne properties.

Official Preparations.

Extractum Cannabis Indicæ.
Tinctura Cannabis Indicæ.

136. **Lupulus.** *Hop.*

The dried strobiles of the female plant of Humulus Lupulus.

Habitat.—Cultivated in England.

Characters.—The strobile of the hop is a spike composed of female flowers, which are situated at the base of membranous scales. The scales are bracts enclosing the achænia or female flowers; the achænia or ovaries are covered over with a yellow powder called lupuline or lupulinic glands, which is the active portion.

Composition.—Lupuline consists of 10 per cent. of a bitter principle called lupulite, 50 per cent. of resin, 2 per cent. of volatile oil, and tannic acid.

Therapeutics.—Tonic, stomachic and narcotic.

Official Preparations.

Infusum Lupuli.
Tinctura Lupuli.
Extractum Lupuli.

NATURAL ORDER.—*Coniferæ.*

137. **Terebinthinæ Oleum.** *Oil of Turpentine.*

The volatile oil distilled from the oleo-resin or turpentine of Pinus Palustris, Pinus Taeda, and sometimes Pinus Pinaster.

138. **Resina.** *Resin.*

The residue of the distillation of the turpentines from the above-mentioned pines.

Characters.—Turpentine is obtained from the pines by making incisions in the stems, when it first flows out it is of the consistence of soft honey, but becomes more or less solid by keeping, on account of loss of volatile oil by evaporation ; when turpentine (the oleo-resin) is heated, oil of turpentine distils over, and the resin of commerce is left. Distilled oil of turpentine contains volatile resin acids ; it is freed from these by redistillation with lime.

Composition of the turpentine or oleo-resin.—Volatile oil, 15 per cent. ; resin, 85 per cent.

Therapeutics.—Stimulant, antispasmodic and astringent.

Official Preparations.

Of oil of turpentine.	Confectio Terebinthinæ.		
	Enema	”	
	Linimentum	”	
	Linimentum	”	Aceticum.
	Unguentum	”	
Of the resin.	Emplastrum Resinæ.		
	Unguentum Resinæ.		

139. **Terebinthinæ Canadensis.** *Canada Balsam.*

The turpentine obtained by incision from the stem of Abies Balsamea, or Balm of Gilead Fir.

Habitat.— Canada.

Characters.—It is improperly called a balsam, for it contains neither benzoic nor cinnamic acids, one of which is essential to a balsam; it is an oleo-resin, like all turpentines. Canada Balsam is contained in receptacles situated between the wood and bark.

Composition.—Canada Balsam consists of a resin dissolved in about 20 per cent. of a volatile oil.

140. **Thus Americanum.** *Common Frankincense.*

The concrete turpentine of Pinus Tæda and Pinus Palustris.

Habitat.—North America.

Characters.—A soft solid, of a bright yellow colour, possessing the odour of turpentine.

141. **Pix Burgundica.** *Burgundy Pitch.*

A resinous exudation from the stem of Abies Excelsa; purified by melting and straining.

Habitat.—Switzerland.

Characters.—Very little of the true Burgundy pitch is seen in commerce; the commercial article mostly consists of resin rendered opaque by incorporation of water and coloured with palm oil.

True Burgundy pitch is soluble in glacial acetic acid.

The spurious article is not.

Composition.—Resin and a little volatile oil.

Official Preparation.—Emplastrum Picis.

142. **Pix Liquida.** *Tar.*

Tar is a bituminous liquid obtained by destructive distillation from the wood of Pinus Sylvestris and other pines. The residue left after the distillation of tar is pitch.

Official Preparation.—Unguentum Picis Liquidæ.

143. Juniperi Oleum. *Oil of Juniper.*

The oil distilled from the unripe fruit of Juniperus Communis.

Habitat.—Northern Europe.

Characters.—The juniper fruit is about the size and colour of a black currant; it is not a berry as commonly stated but a galbulus, which is a cone possessing fleshy bracts; at the top of the juniper fruit is a tri-radiate groove indicating the adhesion of the succulent bracts, at the base are some very small scaly bracts arranged in a stellate manner.

Official Preparation.—Spiritus Juniperi.

144. Sabinæ Cacumina. *Savin Tops.*

The fresh and dried tops of Juniperus Sabina; to be collected in spring.

Habitat.—Cultivated in Britain.

Characters.—The tops consist of the young branches, against which are pressed the small, dark-green, overlapping leaves.

Savin tops are sometimes mistaken for juniper tops; as just stated, the small leaves in savin tops are pressed close to the stem; in the juniper tops, the leaves, which are longer and pointed, stand out at right angles to the stem.

Composition.—Savin tops owe their activity to a volatile oil.

Therapeutics.—An irritant and emmenagogue.

Official Preparations.
Oleum Sabinæ.
Tinctura Sabinæ.
Unguentum Sabinæ.

145. Laricis Cortex. *Larch Bark.*

The bark of Larix Europæa, the common larch.

Habitat.—Mountainous parts of Central Europe.

Characters.—Larch bark from which the external portion has been removed is now official. It may be recognised by its peculiar reddish-brown colour.

Plate 22.

No. 145.

No. 147.

No. 150.

osition.—Larch bark owes its activity to the tannic
ich it contains.
al Preparation.—Tinctura Laricis.

(Not Official.)

larach or gum juniper is obtained from Callitris
valvis. It is sometimes mistaken for mastich, but
distinguished by its tears being much longer than
f mastich.

(Not Official.)

e de Cade (oil of Cade) is obtained by distillation
e wood of Juniperus Oxycedrus.

CLASS II.—**Monocotyledones.**

146. **Zingiber.** *Ginger.*

scraped and dried rhizome of Zingiber Officinale.
itat.—West Indies, India, &c.
acters.—Ginger is dug up when the rhizomes are a
d. Two varieties of ginger are known in commerce,
rbadoes or coated ginger, and the Jamaica or un-
ginger.
Barbadoes or coated ginger is an inferior kind ; the
e when dug up is simply scalded and washed, and
ed with the external coat on.
Jamaica or uncoated ginger is the best ; the rhizome
led and washed, and the coat scraped off.
darker kinds of ginger are sometimes bleached by
g in a solution of chlorinated lime.
position.—A volatile oil, resin, and much starch.
ungency of ginger depends on the volatile oil and

apeutics.—An aromatic stimulant and carminative.

Official Preparations.

Syrupus Zingiberis.
Tinctura Zingiberis.
Tinctura Zingiberis Fortior.

147. Cardamomum. *Cardamoms.*

The dried seeds of Elettaria Cardamomum.

Habitat.—Malabar (India.)

Characters.—The seeds are generally met with in their capsules, the light-coloured pericarps of which should be rejected. Three varieties of cardamoms are known in commerce by the names of shorts (*a*), short-longs (*b*), and long-longs (*c*); the short plump ones are the best. The dehiscence of the cardamom capsule is septifragal.

Composition.—The seeds contain 4·5 per cent. of a volatile oil, to which they owe their aromatic flavour.

Therapeutics.—An aromatic stomachic and carminative.

Official Preparation.—Tinctura Cardamomi Composita.

148. Curcuma. *Turmeric.*

The rhizome of Curcuma Longa, and Circuma Rotunda.

Habitat.—Ceylon.

Characters.—The rhizomes are small, of a yellow colour externally and orange colour internally.

Composition.—A yellow-colouring matter, used as a test for alkalies, which turn it deep brown.

NATURAL ORDER.—*Iridaceæ.*

149. Crocus. *Saffron.*

The dried stigma and part of the style of Crocus Sativus.

Habitat.—Asia Minor; grown in Spain, France, and Italy.

Characters.—Saffron consists of one style and three stigmas; when dried by heat without pressure it constitutes hay saffron. The so-called cake saffron of commerce consists of the flowers of the safflower pressed into a cake with solution of gum.

Adulterations.—Saffron is largely adulterated; the following five are the chief adulterations:—

1. Safflower, the florets of Carthamus Tinctorius, Natural Order Compositæ.
2. Stamens of the saffron plant.
3. Shreds of beef.

4. Oil; incorporated in order to render it heavier.
5. Saffron from which the colouring matter has been extracted.

The first three adulterations are detected when the suspected sample is macerated in warm water, their appearance being quite dissimilar to that of saffron. The fourth can be detected by its leaving an oily stain when pressed between blotting paper, and the fifth by the absence of colour when rubbed on the hand.

Composition.—A yellow colouring matter (Polychroit) and a volatile oil.

Therapeutics.—Chiefly used as a colouring agent.

Official Preparation.—Tinctura Croci.

NATURAL ORDER.—**Smilaceæ.**

150. **Sarsæ Radix.** *Sarsaparilla Root.*

The dried root of Smilax Officinalis; called Jamaica Sarsaparilla.

Habitat.—Central America; imported from Jamaica.

Characters.—The sarsaparillas are classified into two divisions, mealy and non-mealy.

I. MEALY SARSAPARILLAS.

These have a thick swollen cortical portion, from the amount of starch contained in them; hence they are called gouty sarsaparillas. When a section of one of them is touched with strong sulphuric acid, only the woody zone darkens, showing that there alone is the active principle smilacine; a cold decoction of mealy sarsaparilla turns blue on the addition of iodine. The mealy sarsaparillas are the Caraccas or Vera Cruz, the Brazillian, the Honduras, and the Guatemala.

II. NON-MEALY SARSAPARILLAS.

These are the best; the cortical portion is not swollen, and is much smaller and darker than the meditullium. If a section of one is touched with strong sulphuric acid, both bark and wood acquire a purplish tint, showing the presence of the active principle smilacine throughout; a cold decoction gives no blue colour with iodine. The non-mealy sarsaparillas are the Lima, the Vera Cruz, and the Jamaica. Only the latter is official.

The best Jamaica sarsaparilla may be distinguished by the following characters:—it is of a reddish-brown colour, beardy, not swollen, and has most taste.

Adulterations.—Inferior kinds of sarsaparilla.

Composition.—The active principle is smilacine. Raphides are present in sarsaparilla root.

Therapeutics.—An alterative.

Official Preparations.

Decoctum Sarsæ.
Decoctum Sarsæ Compositum.
Extractum Sarsæ Liquidum.

NATURAL ORDER.—**Liliaceæ.**

151. **Scilla.** *Squill.*

The sliced and dried bulb of Urginea Scilla.

Habitat.—The coasts of the Mediterranean.

Characters.—The bulb is composed of a number of fleshy scales overlapping one another; the outer scales which constitute the tunic are thin and membranous. There are two varieties of squill, the white and the red, from the colour of their outer scales; the white is considered the best. Squill should be kept sliced; if kept in the bulb it has a great tendency to germinate. Squill should be kept in a bottle, as it readily absorbs moisture. (It frequently absorbs as much as five times its weight of moisture.)

Composition.—Squill contains scillitine (the diuretic principle) and skuleine (a poisonous body), and saponin (7 per cent).

Therapeutics—Expectorant and diuretic.

Official Preparations.

Acetum Scillæ.
Oxymel Scillæ.
Pilula Scillæ Composita.
Syrupus Scillæ.
Tinctura Scillæ.
Pilula Ipecacuanhæ c̄ Scillâ.

No. 152.

No. 153.

No. 153. b.

No. 153. c.

No. 153. a.

152. **Aloe Barbadensis.** *Barbadoes Aloes.*

e inspissated juice of the leaf of Aloe Vulgaris.
bitat.—West Indies ; imported from Barbadoes.
llection.—The leaves are cut from the Aloe plant, and,
their cut portions downwards, are placed in a vessel,
the juice runs out ; this is then allowed to evaporate
r by exposure to the air in the shade, or to the direct
of the sun. The juice is contained in vessels situated
beneath the epidermis of the leaf.
aracters.—Barbadoes aloes may be recognized by its
appearance, conchoidal fracture, and very nauseous
r. It is generally imported in gourds ; if good, it is
est kind of aloes.

153. **Aloe Socotrina.** *Socotrine Aloes.*

he inspissated juice of the leaves of one or more unde-
ined species of aloe, probably Aloe Socotrina and Aloe
urascens.
abitat.—Socotra (East of Africa).
haracters.—Socotrine aloes may be recognized by its
lish-brown colour, translucent edges, and smell, which
no means unpleasant. It generally comes over en-
ed in membranes.
epatic aloes, *a* (not official) may be recognized by its liver
ur and its opacity (due to the presence of minute crys-
of aloin). It is believed that Socotrine and Hepatic
s are both obtained from the same plant, the only
rence being in the mode of preparation ; Socotrine
s being prepared with heat, Hepatic aloes without heat ;
they both possess the same odour, and the Hepatic aloes
n heated changes into what exactly resembles Socotrine
s.
ape aloes, *b* (not official) is the produce of Aloe Spicata.
abitat.—Cape of Good Hope.
haracters.—Cape aloes may be recognized by its dark
ing appearance, its conchoidal fracture, and sickly odour.
atal Aloes, *c* (not official).
omposition.—Aloes contain amorphous aloin (extracted

by cold water), crystalline aloin (extracted by hot water), and a resin. Aloin was thought to be a glucoside; but though, after boiling with acids, it reduces a copper solution, still aloin itself does this. That this action is not due to sugar is proved by no fermentation taking place when yeast is added. Aloin is probably a compound phenol. No acid except nitric acid has any action on aloin.

Nitric acid added to nataloin produces picric and oxalic acids (a red colour not fading); nitric acid added to barbaloin produces chrysammic acid in addition to the other two (a red colour, quickly fading).

Therapeutics.—Purgative.

Official Preparations.—

Of Barbadoes or Socotrine Aloes	Enema Aloes.
Of Barbadoes Aloes	Extractum Aloes Barbadensis.
	Pilula ”
	Pilula Aloes et Ferri.
Of Socotrine Aloes	Decoctum Aloes Compositum.
	Extractum Aloes Socotrinæ.
	Pilula ”
	Pilula Aloes et Assafœtidæ.
	Pilula Aloes et Myrrhæ.
	Tinctura Aloes.
	Vinum Aloes.

NATURAL ORDER.—*Melanthaceæ.*

154. Colchici Cormus. *Colchicum Corm.*

The fresh corm and the sliced and dried corm of Colchicum Autumnale, the meadow saffron; collected about the end of June, and dried at a temperature not exceeding 150° F., a higher temperature would decompose the Colchicine.

155. Colchici Semina. *Colchicum Seeds.*

The fully ripe seeds of Colchicum Autumnale.

Habitat.—Indigenous.

haracters.—The corm should be collected about the end une, when it is a year old, and has not exhausted itself he production of the new corm. It is biennial. The corm is produced at the side of the old one about June; eptember it flowers. The flowers die down in winter, in spring the leaves appear. The slices of the corms ent a concavity where the young corm was attached ; concavity should not be too deep.

dulteration.—Tulip bulbs (distinguished by their over- ing scales) have been sold for colchicum corms.

mposition.—The corms and seeds contain an alkaloid, icia, combined with gallic acid.

herapeutics.—Used for gout and rheumatism.

Official Preparations.

Of the corm.	Extractum Colchici. Extractum Colchici Aceticum. Vinum Colchici.
Of the seeds.	Tinctura Colchici Seminum.

156. **Sabadilla.** *Cevadilla.*

he dried fruit of Asagræa Officinalis.

abitat.—Mexico.

haracters.—Each fruit consists of a number of papery les, enclosing dark-coloured seeds about a quarter of ach long.

mposition.—Cevadilla owes its active properties to the loid veratria, which exists in combination with gallic . Veratria was formerly supposed to be identical with icia, but they have very different properties.

Colchicia.	**Veratria.**
ble in water.	Insoluble in water.
stallizable.	Not crystallizable.
acrid.	Acrid.
smell.	Produces sneezing when smelt.

herapeutics.—A powerful emetic and drastic purgative.

ficial Preparation.—Veratria.

157. **Veratri Viridis Radix.** *Green Hellebore Root.*

The dried rhizome of Veratrum Viride.

Habitat.—United States and Canada.

Characters.—This rhizome is of a light colour, and has long straggling rootlets of the same colour, by which characters it may be distinguished from white hellebore rhizome.

Composition.—Veratria combined with gallic acid.

Therapeutics.—The same as cevadilla.

Official Preparation.—Tinctura Veratri Viridis.

White hellebore, 157*a* (not official) is the dried rhizome of Veratrum Album.

Characters.—It is darker in colour and has shorter rootlets than the green hellebore.

Composition.—It differs from green hellebore by containing an alkaloid jervine in addition to veratria.

CLASS III.—**Acotyledones.**

NATURAL ORDER.—*Filices.*

158. **Felix Mas.** *Male Fern.*

The dried rhizome, with the bases of the footstalks and portions of the root fibres, of Aspidium Filix Mas; to be collected in summer.

Habitat.—Indigenous.

Composition.—A green fatty fixed oil, a volatile oil, and resin. The official liquid extract contains them all in solution.

Therapeutics.—Anthelmintic.

Official Preparation.—Extractum Filicis Liquidum.

NATURAL ORDER.—*Fungi.*

159. **Ergota.** *Ergot.*

The sclerotium (compact mycelium or spawn) of Claviceps Purpurea, produced within the paleæ of the common rye, secale cereale.

4.

5.

Nº 154.

Nº 156.

Nº 157.

Nº 159.

Nº 157. a.

Nº 158.

Characters.—Ergot is not peculiar to rye. There are three phases in the development of Ergot, viz :—

1. The sphacelium or initial stage of the fungus.
2. The sclerotium, or the hard and compact mycelium.
3. The claviceps purpurea, the perfect fungus, formed if ergots are placed in the earth.

Ergot consists of the organs of nutrition alone ; if allowed to grow under favourable circumstances, the organs of reproduction will be produced.

Composition.—It is believed that ergot owes its properties to a substance called ergotin, of which it contains 1·2 per cent.; it also contains a nitrogenous substance called secalin, and about 30 per cent. of a fixed oil. It is believed that the ergotin is a nitrogenous acid, forming with the secalin an ergotate of secalin.

Therapeutics.—Mostly employed to cause contraction of the uterus.

Official Preparations.

Extractum Ergotæ Liquidum.
Infusum Ergotæ.
Tinctura Ergotæ.

ADULTERATIONS AND TESTS.

Crocus Sativus.

Saffron.

1. Damped or oiled in order to give it a fresh appearance.

   Test.—It should not moisten or grease blotting paper.
2. Florets of Safflower (*Carthamus tinctorius*)

   Test.—When rubbed between the fingers it produces a slight yellow mark only, while genuine saffron produces an intense yellow stain. It may also be detected by macerating in hot water, and viewing through a magnifying lens. The genuine exhibits a filiform style; the Safflower, on the other hand, shows the monopetalous corolla, inclosing syngenesious stamens and forked style.
3. Fibres of beef and the stamens of crocus saffron detected as No. 2.
4. Florets of Marigold (*Calendula officinalis*) distinguished by their shape.

Cinnamomum Zeylanicum.

Cinnamon.

Cassia Bark. Greater thickness, short resinous fracture, shorter and single quills, tincture of iodine gives a blue colour, with a cool decoction of cassia bark, but not with a decoction of cinnamon bark. Both barks contain starch, but the latter contains a larger proportion of tannic acid, which destroys the blue colour.

Digitalis Purpurea.

Foxglove.

1. Ploughman's Spikenard (*Inula Conyza*). Distinguished by its odour.
2. Comfrey (*Symphytum officinale*).
3. Mullein (*Verbascum Thapsus*).

   The latter are downy on both surfaces, digitalis being downy only on the under surface.

Scammonium.

Scammony.

1. *Chalk.* Effervescence on the addition of an acid.
2. *Starch.* Iodine to a cool decoction produces a blue colour.
3. *Dextrine.* Iodine produces a reddish purple tint.
4. *Guaiacum Resin.* Nitrous fumes give a blue colour to paper soaked in the tincture, or, by applying the tincture to the fresh surface of a cut potato, a blue colour will be produced if guaiacum be present, due to the action of the guaiacic acid on the gluten.

Resina Scammoniæ.

Scammony Resin.

1. *Jalap Resin.* Insoluble in Ether.
2. *Guaiacum Resin.* Detected as for Scammony.
3. *Common Resin.* Dissolve it out with oil of turpentine, evaporate the latter off and add sulphuric acid. An intense red colour will immediately be produced if common resin be present.
4. *Sand Ashes, &c.* Should not leave more than 3 per cent. of ash after incineration.

Exogonium Purga.

Jalap.

1. *Tampico Jalap (Ipomœa Simulans).* More wrinkled, lighter in weight, elongated and tapering at each end.
2. *Ipomœa Orizabensis.* Pale colour, lighter in weight.

Arctostaphylos Uva Ursi.

Bearberry Leaves.

1. *Red Whortleberry (Vaccinium Vitis Idæa).* Margins of the leaves revolute and crenate, the under surface dotted.
2. *Box Leaves.* Absence of astringency.

Anthemis Nobilis.

Chamomile.

1. Feverfew flowers (*Pyrethrum Parthenium*). Unpleasant odour and nearly flat receptacle.
2. *Matricaria Chamomilla* (or Wild Chamomile). Conical receptacle, but hollow.
3. *Anthemis Cotula* (Stinking Maywood).

Cephaelis Ipecacuanha.

Ipecacuanha.

1. *Striated Ipecacuanha* (*Pyschotria Emetica*). Longitudinally striated with deep circular intersections.
2. *Undulated Ipecacuanha* (*Richardsonia Scabra*). Jointed appearance and twisted.

Myroxylon Pereiræ.

Balsam Peru.

1. *Castor Oil.* Sulphuric Acid produces a soft resin.
2. *Copaiva.* On distilling a little, and adding iodine to the distillate, an explosion will result if copaiva be present, due to the formation of Hydriodic Acid.

Myroxylon Toluifera.

Balsam Tolu.

1. *Common Resin.* Sulphuric acid will blacken it and give off sulphurous acid gas.

Astragalus Verus.

Tragacanth.

1. *Caramania and Moussul Gums* in broken pieces, and whitened with carbonate of lead.

Myristica Officinalis.

1. Long or Wild Nutmegs. (*Myristica Fatua*) recognised by their greater length.

Senna Alexandrina.

1. Leaves, flowers, and fruits of *Solenostemma Argel.* Detected by being stiffer, thicker, and having an equal base and bitter taste.
2. Leaflets and legumes of *Tephrosia Appolinea.* Emarginate generally folded, veins go straight, equal base.
3. Leaves of *Colutea Arborescens* (Bladder Senna). Detected by equal base.
4. Leaves of *Coriaria Myrtifolia* (Myrtle Sumach). Equal at base, prominent veins. (Poisonous.)

Belæ Fructus.

Bael Fruit.

1. The dried rind of Mangosteen fruit (*Garcinia Mangostana*). Thicker, no adhering pulp and seeds, easily separable epicarp, and by the pieces which come from the top of the fruit possessing radiating stigmas.

Senegæ Radix.

1. *Ginseng Root* (*Panax quinquefolium*). Absence of projecting ridge, greater size, and fusiform shape.
2. *Gilenia trifoliata* as above.

Jateorhiza Calumba.

1. *Coscinium fenestratum.* Not contracted in the centre; very little starch.
2. *Bryony Root* (*Bryonia dioica*). No depression, no starch.
3. *Frasera Walteri.* Contains no starch, but contains tannic acid.

Hellebori Nigri.

Baneberry (*Actæa Spicata.*) Astringent properties. Reddish tinge externally, cruciform, and triangular meditullium.

Balsamodendron Myrrha.

Myrrh.

1. *Indian Bdellium* (*Balsamodendron Mukul*). Becomes soft when rubbed between the fingers; often has the hair of goats attached; darker in colour, and warty.
2. Various gums, resins, &c.

Galipera Cusparia.

Or, True Angustura Bark.

1. *Nux Vomica, or, False Angustura Bark.* Twisted and arched backwards. Nitric acid applied to the inner surface gives a blood-red colour, due to the action of the nitric acid on the Brucia contained in the Nux Vomica bark.

Guaiacum Resin.

Common Resin. Odour of turpentine evolved on heating, or by dissolving the guaiacum resin in alcohol, and adding Liquor Potassæ until the liquor becomes clear. If, on the addition of more Liquor Potassæ a precipitate occurs, common resin is present.

Krameriæ Radix.

1. *Savanilla Rhatany* (*Krameriæ Ixina*). Externally dark, violet colour, bark firmly attached; cracks extending across the root, possesses a soapy feel.
2. *Para Rhatany.* May be bent to and fro without breaking. The Peruvian Rhatany would snap.

Garcinia Morella.

Gamboge.

1. *Starch.* A cold decoction becomes green on the addition of solution of iodine. It is due to the mixture of the blue colour of the iodide of starch with the yellow colour of the Gamboge.

Canella Alba.

1. *Winter's bark (Drymis Winteri)*, or (*Cinnamodendron Corticosum*), distinguished by having its inner surface darker than the outer. An infusion will strike a black colour with salts of iron from the tannic acid contained in it. Canella alba contains no tannic acid.

True Pareira.	**False Pareira.**
Obtained from *Chondodendron Tomentosum.*	Supposed to be obtained from *Cissampelos Pareira,* but according to Hanbury such is not the case.
1. Darker in colour.	1. Lighter in colour.
2. When cut presents a waxy appearance.	2. When cut presents a rough appearance.
Generally possesses only 3 or 4 concentric rings of wood.	

The *root* may be distinguished from the *stem* by being darker in colour and more irregular, often containing short rootlets, no perceptible pith, and no development of lichens.

Opium.

1. Inferior kinds from which the morphia has been extracted, quality ascertained by B. P. test.
2. *Stones, gravel, bullets, &c.* Detected by washing the opium on a sieve.
3. *Starch.* Tincture of iodine to a cool decoction produces a blue colour.

Sinapis.

Mustard.

1. The powder is often adulterated with flour or starch. A cold decoction of mustard should give no blue colour with tincture of iodine.

TABLES OF OFFICIAL FRUITS.

Cremocarp.

Conii Fructus. Fœniculum dulce. Carum Carui.
Pimpinella Anisum. Coriandrum Sativum.
Anethum Gravolens.

Berry.

Piper Nigrum. Pimenta.
Cubeba. Rhamnus Catharticus.

Hesperidium.

Citrus Aurantium. Citrus Limonis.
Ægle Marmelos.

Pepo.

Ecbalium Officinarum.
Citrullus Colocynthidis.

Drupe.

Cocculus Indicus.

Capsule.

Papaver Somniferum.

Lomentum.

Cassia Fistula.

Cynarrhodum.

Rosæ Caninæ Fructus.

Galbulus.

Juniperus Communis.

Legume.

Capsici Fructus.

Syconus.

Ficus Carica.

Nuculanium.

Uvæ.

Balausta.

Pomegranate Fruit.

TABLE OF PER CENTAGES, &c.

Table 1. Tannic Acid.

Names.	*per centage.*	*Small quantities present.*
tany Root	40	Hop.
nentilla Rhizome	18	Senega.
ıegranate Root Bark	20	Cloves.
Catechu	40	Cinnamon.
:berry Leaves	36	Bebeeru Bark.
Bark	3	Winter's Bark.
„	6 to 10	Logwood.
s	40	Chamomile.
)	40	
k Catechu	40	

Table II. Volatile Oils.

	Per cent.	*Small quantities present.*
rh	2·5	Winter's Bark, Buchu Leaves, Cusparia Bark.
ıiba	40	Mastich, Elemi, Bals. Peru, Bals. Tolu.
'es	⅙th its weight.	Logwood, Senna, Kousso, Pimento.
ıfœtida	4	Galbanum, Ammoniacum, Sumbul.
nomile	2 to 3	Elder Flowers, Valerian, Pellitory, Santonica.
	7·5	Arnica, Lobelia, Bearberry Leaves, Nutmegs.
ebs	10·5	Cinnamon, Sassafras, Serpentary.
Anise	Not known	Mezereon, Cascarilla, Blk. Pepper.

Table III. Fixed Oils.

	Per cent.		*Per cent.*
tard (*black*)	28	Nutmegs	30
, (*white*)	36	Male Fern	?
ıeed	22 to 27	Ergot	30
.onds (*bitter*)	50	Stramonium Seeds	22 to 30
„ (*sweet*)	36 to 50		

Table IV. Resins and Oleo-resins.

Names.	*Per cent.*	*Small quantities present.*
Podophyllum Rhizome	3 to 4	Canella Alb.
Gamboge	75	Cusparia.
Guaiacum Wood ...	3 to 4	Kousso.
Myrrh	28	Sumbul. Pellitory.
Copaiba	50	Arnica. Lobelia.
Benzoin	80	Capsicum. Rhubarb.
Scammony Root	4	Sassafras.
Gum Scammony	80	Cascarilla.
Jalap	18	Cubebs.
Hop Glands	50	Ginger.
Mastich	All Resin.	Male Fern.
Elemi	Large quantities, but amount not determined	Indian Hemp.
Balsams of Peru and Tolu		Black Pepper.
Assafœtida		Mezereon.
Galbanum		Pimento.
Ammoniacum ...		Logwood.
Burgundy Pitch	Mostly Resin.	Winter's Bark.

Table. V. Alkaloids, &c.

	Per cent.		*Per cent*
Opium (*morphia*)	8	Cinchona, pale (*alkaloids*)	½ to
Guarana (*guaranine*) ...	5	Bebeeru Bark (*beberine*) ...	2·
Cinchona, yellow (*quinine*) ...	2	Ipecacuanha (*emetine*) ...	
„ red (*alkaloids*) ...	2	Ergot (*ergotin*)	1·
Nux Vomica (*strychnia*)	½ to 1	St. Ignatius Beans (*strychnine*)	1·

Table VI. Various Active Principles.

	Per cent.		*Per cen*
Balsam of Peru (*cinnamic acid*)	6	Benzoin (*benzoic acid*)...	15 to
„ Tolu („)	?	Manna (*mannite*) ...	60 to
Elaterium (*elaterin*)... ...	20	Rhubarb (*raphides*) ...	40

METHODS FOR EXTRACTING THE B. P. ALKALOIDS, RESINS AND GLUCOSIDES.

Aconitia.

Dissolve out the natural salt of the alkaloid from the root by rectified spirit, recover the spirit by distillation, mix the residue with water, filter, precipitate the aconitia with solution of ammonia, dry the precipitate and digest it in ether (in which some of the impurities are insoluble), recover the ether by distillation, dissolve the residue left in the retort in water acidulated with sulphuric acid, precipitate the alkaloid by solution of ammonia, wash and dry.

Atropia.

Dissolve out the natural salt of atropia from the root by spirit, precipitate the acid (malic acid) and some of the colouring matter by the addition of lime, filter and add sulphuric acid, to form sulphate of atropia (which is less liable to decomposition during the operations), recover the spirit by distillation, add solution of carbonate of potash till nearly neutral, by which means resinous matter is precipitated, filter and add excess of carbonate of potash to precipitate the atropia, dissolve out the atropia by shaking the liquid with chloroform; remove the chloroform solution, distil off the chloroform, dissolve the atropia in warm spirit, free from colouring matter by means of animal charcoal, evaporate and set aside for the atropia to crystallize out.

Strychnia.

Subject the seeds to steam, dry them rapidly and grind them to a powder, exhaust this with spirit, distil off the spirit and dissolve the extract in water, precipitate the acid (igasuric acid which becomes decomposed into lactic acid) and colouring matter with acetate of lead, filter (by which means acetate of strychnia is obtained in the filtrate); evaporate and precipitate the strychnia with solution of ammonia, wash and dry. The strychnia so obtained is contaminated with brucia, from which it is freed in the following manner: dissolve in rectified spirit, distil off most of the spirit, evaporate and set aside to crystallize, pour away the mother-liquor (which contains the brucia), wash the strychnia with spirit and water (to remove brucia), until the washings cease to give a red colour with nitric acid (showing absence of brucia), dissolve the strychnia in boiling spirit and set aside to crystallize.

Morphia.

Infuse opium in water and strain, concentrate the infusion, add solution of chloride of calcium (to form meconate of calcium and hydrochlorate of morphia), evaporate until it becomes solid on cooling, and press the mass in a calico bag, the dark liquid which is expressed contains most of the colouring matter, but very little morphia; dissolve out the hydrochlorate of morphia from the pressed mass with boiling water, evaporate the liquid until it solidifies and press again, if the expressed liquid is much coloured, repeat the operation a third time. Dissolve the pressed cake in boiling water, decolourize by means of animal charcoal, filter and add solution of ammonia in slight excess to precipitate morphia, wash the morphia in cold water, and dry.

Sulphate of Beberine.

Exhaust the bebeeru bark with water acidulated with sulphuric acid, concentrate, remove most of the acid by the addition of lime (taking care to keep it still acid), filter, precipitate the beberine with solution of ammonia, wash, dry and dissolve in spirit (in which some of the impurities are insoluble), distil off most of the spirit, neutralize with dilute sulphuric acid (to form sulphate of beberine), evaporate to dryness, dissolve the sulphate of beberine in water, evaporate to a syrup and spread on glass plates to dry at 140° F.

Veratria.

Exhaust the disintegrated cevadilla seeds with alcohol, distil off most of the spirit, pour the residue into water (by which means much resin is precipitated), filter and precipitate the veratria with solution of ammonia, purify by washing it with water, then dissolve it in dilute hydrochloric acid, decolourize by means of animal charcoal, filter, precipitate with solution of ammonia, wash and dry.

Sulphate of Quinine.

Exhaust the yellow cinchona-bark by maceration and percolation with water acidulated by hydrochloric acid (by which means a solution of hydrochlorate of quinine is ob-

tained), add solution of soda to the liquid in order to precipitate quinine, dissolve the precipitated quinine in the proper proportion of hot dilute sulphuric acid, evaporate and allow the sulphate of quinine to crystallize out.

Digitalin.

Dissolve the digitalin out of the digitalis leaf by means of rectified spirit, distil off the spirit, dissolve the residue in water with a little acetic acid, decolourize by means of animal charcoal, filter, neutralize most of the acetic acid with tannic acid (with which it forms an insoluble tannate of digitalin), wash, then rub and heat it with spirit and litharge (which forms insoluble tannate of lead and sets free digitalin, which is dissolved by the spirit), decolourize by means of animal charcoal, filter, evaporate to dryness, wash out impurities with ether, and dry.

Santonin.

Boil Santonica with slaked lime and water (soluble santonate of lime is formed), strain, precipitate the santonin with hydrochloric acid, wash it with solution of ammonia (to remove resin), dissolve in spirit and decolourize by means of animal charcoal, filter while hot, set aside to deposit crystals of santonin, and purify by recrystallization from spirit.

Jalap and Scammony Resins.

Both resins are prepared by making tinctures of the roots, and precipitating the resin from these tinctures by the addition of water.

Podophyllum Resin.

The B. P. process for the preparation of this resin is to make a tincture with rectified spirit of podophyllum rhizome, and to pour this tincture into water acidulated with hydrochloric acid, the water precipitates the resin from the tincture; and in presence of the hydrochloric acid some berberine dissolved out from the podophyllum rhizome is also precipitated.

Another method of preparing podophyllum resin is to pour the tincture into a solution of alum, which precipitates the resin in a compact granular form; it is extremely probable that podophyllum resin is frequently prepared in this way, for commercial samples of the resin frequently contain alum.

DEFINITIONS.

Acids are bodies which contain hydrogen capable of being displaced by metals, have a sour taste, redden blue litmus paper, and combine with pure caustic potash or soda, evolving water and forming salts.

Albumen is an organic substance containing nitrogen, and coagulates when boiled with water.

Alkalies are bodies which possess a more or less corrosive taste, turn red litmus paper blue, and combine with acids to form salts.

Alkaloids are organic bases containing nitrogen, they are regarded as derivatives of ammonia, in which one or more of the atoms of hydrogen are displaced by organic radicals. They resemble ammonia—

Firstly.—By giving off analogues of ammonia gas when heated with caustic potash.

Secondly.—By combining with the hydrogen as well as with the acidulous radical of an acid.

Thirdly.—By their containing nitrogen.

Fourthly.—By their hydrochlorates giving precipitates with perchloride of platinum.

Aloins are regarded as complex phenols, that is, phenol in which hydrogen is displaced by various radicals.

Balsams are bodies containing a volatile oil, resin, and either cinnamic or benzoic acid.

Balsamic resins are bodies containing resin, with benzoic or cinnamic acid.

Casein is an albuminoid substance, differing from albumen by not being coagulated by heat ; resembling albumen by being precipitated by acids.

Chlorophyl is the name given to a resinous substance which gives the green colouring matter to plants It consists of two colouring matters, a blue called phyllocyanin, and a yellow called phylloxanthin. It is only developed under the influence of light. The decomposition of carbonic acid gas by plants is probably due to this substance.

Colouring matters are bodies which absorb one or more of the coloured rays of light, and reflect the complementary rays.

Dextrin is an isomer of starch resembling it in its per centage composition, but differing from it in properties. Thus, starch is insoluble in cold water, while dextrin is soluble; starch gives a deep blue colour with iodine, dextrin does not. It may be formed from starch by simply exposing starch to a temperature of 320° F. for a short time, by boiling starch with dilute sulphuric acid, or by boiling starch with water, to which a little malt has been added.

Elæoptens are liquid hydrocarbons occurring in volatile oils.

Extractive matter is the name applied to substances whose composition has not been determined, and which can be extracted by solvents.

Fats are solid bodies, being compounds of fatty acids with organic bases.

Fibrin is an albuminoid substance contained in blood, coagulating spontaneously, in this differing from albumen, casein, or gelatine.

Fixed Oils are liquid compounds containing fatty acids in combination with organic bases, and cannot be distilled without decomposition. Drying oils are those which, by absorption of oxygen, become converted into resinous masses.

Gelatine is a nitrogenous substance which unites chemically with some of the water in which it is boiled, and on cooling, this new compound solidifies.

Glucosides are organic substances which, when boiled with a dilute acid, assimilate the elements of water, yielding glucose or grape sugar as one of the products.

Gums are substances which dissolve in water, yielding a thick mucilaginous liquid coaguable by alcohol or solution of acetate of lead.

Gum Resins are compounds of gum with resin, the gum, in which may be dissolved by water, forming a mucilage, which then assists in suspending the resin forming an emulsion.

Inspissated Juices are bodies obtained by submitting the juices of plants to spontaneous evaporation.

Isomeric bodies are those which agree in centesimal composition but differ in their properties.

Oleo Resins are solutions of a resin in a volatile oil.

Pectin is vegetable jelly, and is the substance to which the gelatinizing properties of vegetable juices are due.

Raphides are crystalline structures occurring in older cells, and which consist for the most part of oxalate of calcium.

Resins are solid bodies, closely resembling stearoptens, but differ from them in not being volatile.

Soaps are compounds of the fatty acids, with inorganic bases.

Starch is a compound of carbon, hydrogen, and oxyen, existing chiefly in those parts of plants removed from the influence of light, where it is stored up for the future nourishment of the plant. Before it can be used by the plant, it is converted first into dextrin and afterwards into sugar. When boiled with dilute sulphuric acid, it is converted first into dextrin and afterwards, by the assimilation of the elements of water, into grape sugar.

Stearoptens are solid camphor-like bodies, which are volatilized by heat. They form the solid portion of a volatile oil, and consist of oxidized hydrocarbons.

Sugar is a compound of carbon, hydrogen, and oxygen, which, by fermentation, yields alcohol and carbonic acid gas. It has a sweet taste, and is soluble both in water and alcohol. It contributes to the nourishment of plants, being derived from the starch contained in them.

Volatile Oils are usually compounds of liquid hydrocarbons called elæoptens, and solid oxidized hydrocarbons called stearoptens. They are volatile, and can be distilled without decomposition. The elæoptens being more volatile than stearoptens, they can be separated by fractional distillation.

APPENDIX.

QUESTIONS IN MATERIA MEDICA.

The following questions are inserted to afford an indication of the style and scope of examination of the subject of Materia Medica:—

1. Into how many subdivisions is the vegetable kingdom divided?
2. What parts of Aconitum Napellus are official?
3. Where is aconite cultivated?
4. Is Podophyllum Radix a root or a rhizome? State the difference between the two.
5. Is Helleborus Niger official? with what has it been frequently adulterated? and give the best means of distinguishing this adulteration.
6. What kind of a fruit is star anise; from what source is it obtained; and what is its use?
7. What is the source of the true Winter's bark?
8. From what other source is Winter's bark principally obtained?
9. Give the natural orders and habitats of the following drugs:—Calumba Radix, Winter's bark, Star Anise, Staphysagriæ Semina, Hellebori Nigri Rhizoma, Podophylli Radix, and Aconiti Radix.
10. What is the active principle of aconite due to? and state in what part of the plant it chiefly resides.
11. What is the composition of podophyllum; what per centage of resin does it yield; and give its mode of extraction.
12. Why does the B. P. order water acidulated with hydrochloric acid; how much acid should be used; and give the therapeutic properties of the resin and its dose.

13. To what is the colouring matter of calumba due?
14. In what drug was the alkaloid berberine first discovered?
15. Name at least three adulterations of calumba, and state which of the three contains tannic acid.
16. In what part of the globe are the Straits of Magellan, Ibo, Zambesi, and Cordofan?
17. Name all the drugs which contain saponin.
18. From what source is the Christmas rose obtained, and what are its peculiarities?
19. How would you distinguish aconite from horseradish when scraped?
20. What is the test between aconitia and pseudo-aconitia? and state which is principally found in commerce.
21. With what is aconitia combined in Aconitum Napellus?
22. How many kinds of aconite are there, and which yields the most aconitia?
23. What parts of the plant are used in making the Extract, Tincture, and Liniment of Aconite?
24. What test is applied by the natives as to the quality of calumba?
25. What is the cause of the depression in the centre of calumba?
26. What is the cause of the small holes often seen in calumba; which are considered the better, those with holes or those without; and why are small pieces considered better than large ones?
27. What kind of dehiscence has star anise? how many seeds are contained in each carpel?
28. How would you distinguish Canella Alba bark from Winter's bark? Give a physical and a chemical test.
29. In what state does the berberine exist in calumba?
30. What per centage of starch is contained in calumba, and how would you detect its presence?
31. Why is cold water used in making infusion of calumba?
32. In what portion of the root does the active principle generally reside?
33. Name the natural orders of Bryonia Dioica, Frase Walteri, and Coscinium Fenestratum?
34. Is oleum anisi a volatile or a fixed oil?

QUESTIONS IN MATERIA MEDICA.

Name two substances often used to adulterate oil of aniseed; for what purpose they are used; and give the best means of detecting their presence.

Name all the official drugs belonging to the natural order Menispermaceæ.

Into how many divisions is the sub-kingdom Phanerogamia divided ?

What substances are obtained from the following plants :—Pistacia Terebinthus, Pistacia Lentiscus, Boswellia Thurifera, Canarium Commune, Mucuna Pruriens, and Pterocarpus Santalinus ?

What is frankincense ? What is it principally used for ?

Will myrrh form an emulsion with water; if so, what is it due to ?

Name six official preparations which contain myrrh.

Where are the Island of Scio, Coromandel, Malabar, and the Grecian Archipelago ?

What is the cause of elemi becoming hard on keeping ?

Give a brief account of the collection of myrrh, and state the difference between myrrh in tears and myrrh in sorts.

Myrrh when broken frequently presents internally a number of white spots or veins. What is the cause of these ?

State which of the following drugs are official in the B P., 1867 :—Chian Turpentine, Mastich, Frankincense, Cowhage, Kino, Elemi.

What is the powder seen mixed with mastich ? What is the origin of its name ?

Give the composition of the following drugs :—Mastich, Myrrh, Elemi, Broom Tops, Kino, Tragacanth, and Liquorice.

Name four drugs which belong to the natural order Rutaceæ.

Give the natural orders and botanical names of the following :—Sinapis, Stramonium, Areca, Benzoinum, Jaborandi, and Pareira.

What is myrrh adulterated with ; how would you distinguish its adulteration ; and from what source is it obtained ?

52. Why was myrrh called Turkey Myrrh, and from what country is myrrh now imported?
53. To what division of the vegetable kingdom do the following natural orders belong:—Coniferæ, Filices, Liliaceæ, Smilaceæ, Melanthaceæ, and Graminaceæ?
54. Give the natural orders of the following drugs:—Galbanum, Sassafras, Buchu, Armoraceæ Radix, Star Anise, and Conii Folia.
55. What are the official preparations of elemi, broom, and tragacanth?
56. What is the sweetness of Glycyrrhizæ Radix due to, and what is Solazzi juice?
57. Why is the root decorticated, and where is it cultivated?
58. What is the adulteration of tragacanth, and how would you detect its adulteration?
59. What is the test between tragacanthin and arabin?
60. What is the cause of some pieces of tragacanth looking white, while others have a yellow appearance?
61. What preparation does red sandal wood enter into?
62. Name a poisonous principle found in broom. To what does it owe its diuretic properties?
63. Name all the official drugs belonging to the natural orders Guttiferæ and Cruciferæ.
64. What is the difference between kinos and catechus?
65. Name the four kinds of kinos met with in commerce, and state which was first known in this country.
66. Name four adulterations of senna; state which is poisonous.
67. Which kind of senna is most adulterated, the Alexandrina or Tinnivelly?
68. Which of the two should be used in the B.P. preparations?
69. Where are New Granada, Calabar, Salvador, and Campeachy?
70. How is Balsam of Peru obtained?
71. How would you detect the presence of copaiva and spirit in Balsam of Peru?
72. Give the natural orders of kino, squill, cusso, lettuce, safflower, and copaiba.

3 How would you distinguish a thallogen from an acrogen?

4 What are the distinctive characters of the sub-class Monochlamydeæ?

5 How is cinnamic acid formed in Balsam of Peru?

6 How would you distinguish cinnamic acid from benzoic acid?

7 What is the cause of Balsam of Tolu becoming hard by keeping?

3 How would you detect common resin occurring as an impurity?

What is the difference in composition between Bálsam of Tolu and Peru?

To what does Calabar bean owe its activity?

What is the difference between Extractum Physostigmatis and Extractum Belladonna when applied to the eye?

Point out the *hilum, foramen,* and *chalaza* on a Calabar bean.

From what part of the tree is logwood obtained?

What are the crystals frequently found on the logs?

Name five drugs which belong to the natural order Ranunculaceæ.

Which senna yields the most active principle? To what are its purgative properties due?

What is cassia pulp official for?

What name is applied to the spurious dissepiments in the cassia pod?

How would you estimate the quality of cassia pods?

In what way is the pulp obtained from the pods?

Distinguish between the ventral and dorsal suture in them.

How is opium obtained, and when should it be collected? Are the incisions made in the ripe or the unripe capsules, and what would occur if the incisions were made right through the capsule?

Which are maw seeds, the seeds of the white or black poppy? Are they used for any special purpose?

Do poppy capsules, as used in medicine, contain any of the alkaloids found in opium?

95 Name four different varieties of opium found in commerce, and two not.
96 Name the best variety and the per centage of morphia it yields.
97 Which variety is covered externally by the capsules and seeds of a species of Rumex?
98 Name the varieties which are enveloped in the following leaves. Poppy leaves. Oriental plane.
99 What kind of venation has the latter leaf?
100 How would you distinguish Persian from the other kinds?
101 Which kind is it that does not darken on keeping?
102 Name the principal adulteration of opium.
103 How would you estimate a sample of good opium?
104 Why is it objectionable to use opium of too soft a consistence?
105 Describe the B. P. process for making morphia.
106 In what state does morphia exist in opium?
107 How would you obtain meconic acid from opium?
108 What is the action of neutral ferric salts upon it, and how would you distinguish the colour produced, from ferric sulphocyanide?
109 Is morphia an alkaloid? Is it acid, neutral, or alkaline?
110 What is the action of morphia on iodic acid and ferric salts?
111 From what source is codeia obtained?
112 How would you distinguish it from morphia?
113* What is paramorphia, and how may this be distinguished from morphia?
114 Name a neutral principle which exists in opium in the free state.
115* What is the definition of an alkaloid? Give four reasons why they are believed to be derivatives of ammonia.
116* In what state does narcotine exist in opium? How may it be extracted, and distinguished from morphia and codeia?
117* What is formed when it is dissolved in sulphuric acid?

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* The questions marked with an asterisk are intended specially for Major Students.

118 What proportion of opium is contained in the following preparations:—confectio opii, pil. saponis co., pulv. kino co., tinctura opii, tinctura opii ammoniata?

119 From what source is the *true* pareira root obtained?

120 From what source is the *false* pareira root obtained?

121 By whose authority have we learned that the source of the false pareira is not that of Cissampelos pareira?

122 Give two or more characters which will distinguish the true from the false.

123 How would you distinguish the root from the stem?

124 What is the composition of the true and false pareira?

125* With what alkaloid is the bitter principle of the Cissampelos identical?

126 Name all the official preparations in which pareira root is used.

127 Name four official drugs whose composition has not been clearly ascertained.

128 What are the therapeutic properties of pareira?

129 With what are cocculus indicus likely to be confounded?

130 Describe a cocculus indicus fruit.

131 How would you estimate its quality? Is it official? For what purpose is it used?

132 Is cocculus indicus a berry or drupe? State the difference between them.

133* Name the two alkaloids existing in the pericarp, and state how you would distinguish one from the other.

134* Name the neutral principle found only in the seed.

135 For what purpose is the red poppy official? Is this the variety known as corn poppy?

136 Which makes the better preparation, the dried or the fresh petals?

137 What per centage of morphia do they contain? At what particular time should they be gathered?

138 How many varieties of the papaver somniferum are there?

139 From what portion of the poppy is opium obtained?

140 How would you distinguish between the white and black varieties?

141 When are poppy capsules most active, and when should they be gathered?

142 What is the star-like portion seen on the top of the capsule?

143 What kind of dehiscence and placentation has the poppy?

144 Without breaking open the capsule, how could you ascertain the number of placentas in the cavity of the ovary?

145 Name a substance which is contained in black mustard seeds and not in the white.

146 What is the composition of black mustard?

147 What is the pungent odour due to when the black mustard seeds are rubbed with water?

148 Which kind of mustard (the black or the white) is used in preparing the flour of mustard, and why?

149 Name three official drugs which contain no volatile oil ready formed, but when distilled with water readily yield the oil.

150 Describe the formation of the volatile oil.

151 With what is the flour of mustard frequently adulterated? How detect it?

152 Why should not boiling water be used in preparing mustard for the table?

153* What is the composition and formula of the volatile oil of mustard?

154 To what is the acrid taste of the white mustard seeds due?

155 Name a substance contained in the white, which does not exist in the black.

156 Do white mustard seeds yield any volatile oil when distilled with water, and why?

157 Name two drugs which contain myrosin and myronate of potassium?

158 Name an official preparation into which the volatile oil enters?

159 How are Acotyledonous plants propagated? How many cotyledons do they contain, and what kind of germination and venation have they?

160 How do you know when a plant belongs to the subclass thalamifloræ?

161 What is the cause of the pungent odour produced when horseradish is scraped?

162* With what volatile oil was the oil of horseradish believed to be identical?

163* What is the difference between them?

164* How would you prove that the volatile oil does not exist ready-formed in the root?

165 Why is the root ordered to be scraped and not powdered?

166 To what natural orders do the following drugs belong? Cassiæ pulpa, scoparii cacumina, amygdala dulcis, arnicæ radix, and taraxaci radix?

167 Are violets official? For what purpose are they frequently used?

168* What are the effects of acids and alkalies on the colouring matter of violets?

169 Name all the official drugs, and one adulteration, belonging to the natural order Amyridaceæ.

170 What is the principal character of Senega root by which it may be known?

171 In which portion of the root does the active principle reside?

172 With what is Senega root frequently adulterated, and how are the adulterations detected?

173 What is the composition of Senega root?

174 To what is the frothing of infusion of Senega due?

175 What are the therapeutic properties of Senega?

176 Name two official preparations of Senega, with their strengths and doses?

177 Name four drugs which belong to the natural order Melanthaceæ.

178 Give the botanical names and natural orders of the following drugs:—kamala, pale catechu, squirting cucumber, matico leaves, ipecacuanha, and hop.

179 From what sources are the Para, Savanilla, and Peruvian rhatanies obtained? State which is the official, the best, and the difference in characters.

180 To what are its astringent properties due?

181 Name three official preparations of its own, and one other into which it enters.

182 Give the habitats of krameria triandria, Senega, armoraciæ radix, sinapis nigra, and alba.

183 What relation does the plant of the linum usitatissimum bear to the common flax?

184 What is *lint, tow,* and *linen*?

185 What per centage of fixed oil is obtained from linseed, both with and without heat?

186 Why are the seeds not crushed in making the infusion?

187 What is cotton wool? To what natural order does it belong, and for what is it official?

188* What is the composition of cotton?

189 Why is linen preferable to cotton for dressing wounds?

190 Is althææ radix official? When should it be gathered? For what purpose is the epidermis removed?

191 Why is heat applied in the extraction of the concrete oil of theobroma?

192 What is cocoa and chocolate?

193 In what does prepared cocoa differ from ordinary cocoa?

194 What advantage has the oil of theobroma over other oils?

195 What per centage of oil do the seeds yield?

196 For what preparation is the oil official? Name a substance which is considered by some to be superior to oil of theobroma, for this purpose?

197 What alkaloids, &c., are found in the seeds?

198 What is Guarana? What does it resemble in shape, is it official, for what purpose is it used, and how is it administered?

199 What is its composition?

200 Name *three* drugs which contain an alkaloid similar to theine.

201 What is the natural order and habitat of Guarana?

202 Which orange peel is official, the bitter or sweet, fresh or dried, and for what preparations?

229 What is the cause of the opacity of gum acacia?

230 How would you distinguish Senegal gums from gum acacia?

231 What per centage of water is contained in gum acacia?

232 State what metal is found in gum, and in what state it exists.

233 When mucilage of acacia is mixed with a solution of subacetate of lead, what is the gelatinous precipitate formed?

234 Is gum acacia soluble in proof spirit?

235 Which kind of rose petals is used in preparing aqua rosæ, confectio rosæ, infusum rosæ acidum, and syrupus rosæ?

236 From which kind of rose is the volatile oil (called otto of roses) obtained. and by what process?

237 Give the official names of the cabbage rose, red rose, dog rose, and rosa canina.

238 What kind of a fruit is the hip?

239 Describe briefly the hip, and state what the so-called seeds which they contain really are, and why they are ordered to be removed.

240 What is the difference in composition between the various roses?

241 Why are the red rose petals ordered to be kept away from the light?

242 Is black catechu official? for what purpose is it used? and from what portion of the wood is it obtained?

243 Is it of the same natural order and source as the pale catechu?

244 Give the distinctive character by which it may be recognized.

245 Give the natural orders and botanical names of the following :—Indian hemp, dulcamara, ginger, cascarilla, cacao butter, chirata, crocus, long pepper, black catechu, tragacanth, socotrine aloes, chamomile flowers, and pellitory root.

246 How would you distinguish between bitter and sweet almonds by appearance?

247 From which of the two almonds is the fixed oil principally obtained, and why?
248 From which is the volatile oil obtained?
249 What per centage of fixed oil is contained in the bitter almond?
250 What does the brown coat of the seed and the white portion inside constitute?
251 How many cotyledons are contained in one seed; does it belong to the Exogens or Endogens?
252 What are the small projections visible at the apex of the seed when opened?
253 Name a substance which exists in the bitter but not in the sweet almond.
254 Describe the production of the volatile oil when the bitter almonds are rubbed with water.
255 Where would you find the albumen in an almond?
256 When there is no albumen present, what name is applied to the seed?
257 Name another drug which is similar in composition to the bitter almond.
258 What is the poisonous principle in the essential oil of almonds? give the per centage.
259 How would you render it non-poisonous?
260 Of what do the almonds, as we see them (in the shell), consist of?
261 What kind of almond is ordered to be used in the Pharmacopœia?
262 What kind of almond is used in making the official mixture and powder?
263 Is Tormentillæ Rhizoma official? To what are its astringent properties due?
264 Name all the official drugs with one adulteration which belong tothe natural order Gentianaceæ.
265 What is the composition of cherry-laurel leaves?
266 What products are formed when they are distilled with water?
267 For what purpose are they official?
268 Name three drugs where the entire plant is used; four drugs in which the flowers and tops only are official.

269 What are the properties of cusso?
270 To what does it owe its activity?
271 What peculiarity is there about the infusion?
272 What portion of the plant is a clove?
273 What is the radiating part and the small round l
situated on the top of the clove?
274 Give the botanical names and natural orders of genti
chirata, cubebs, digitalis, black pepper, capsicum,
cloves.
275 What are mother cloves?
276 What is the active principle of cloves?
277 Name four volatile oils which are heavier than wate
278 How estimate the quality of cloves?
279 For what preparations are they official?
280 Why are pimento berries called allspice?
281 Why are they ordered to be gathered unripe?
282 What is the small ring seen on the top of the berry?
283 Where does the active principle reside?
284 What takes place when oleum pimentæ is put into wat
285 What are the official preparations of pimenta?
286 Give the natural orders of the following drugs:—me
reon, nux vomica, quassia, rhubarb, jalap, sene
elim bark, and valerian.
287 From what source is sumbul root obtained?
288 What odour does it resemble?
289 How many varieties are there in commerce, and whi
is the best?
290 State how you would distinguish one from the other?
291 To what are the active properties of sumbul due? Is
official?
292 What kind of an inflorescence is sambucus niger.
293 To what is the odour due, and for what purpose is
official?
294 How would you distinguish yellow cinchona bark fro
carthagena or coquetta bark?
295 Is there more than one variety of yellow cinchona?
what state do they occur?
296 How would you distinguish quilled yellow from pal
cinchona bark?

7 Of what portion of the bark does the yellow consist?

8 What is the cause of the grooved depressions seen on its outer surface?

9 Which bark has the shortest fracture?

0 From what source is the carthagena bark obtained?

1 Is it official? if so, for what purpose?

2 Give the composition of the red, pale, and yellow cinchona barks.

3 In what state does the quinine exist in the bark?

4 Which kind of bark is known as Loxa, or crown bark?

5 Where is Loxa, and Chimborazo?

6 In what state does the red cinchona occur in commerce?

7 How would you distinguish the red cinchona in quills from the other quilled barks?

8 Name an adulteration of red cinchona, and state how you would detect it?

9 Is the red official? if so, for what purpose?

0 What are the properties of cinchona bark?

1 Name *five* official preparations made from the yellow, *one* from carthagena, *two* from the pale, and all you know from the red cinchona bark.

2 Give the botanical names and natural orders of ergot, filix-mas, quercus cortex, hemidesmi radix, krameria, and lobelia.

3 When should conium leaves be gathered?

4 For what purpose are they used, and why is it called the spotted hemlock?

5 What is the shape of the leaves?

6 What part of the plant is used in making the extract, succus, and cataplasma conii.

7 What kind of a fruit is conium?

8 Do the vittæ in conium contain any volatile oil?

9 Which fruit is official, the ripe or the unripe?

0 When should conium fruit be gathered?

1 To what do they owe their activity?

2 With what is the active principle combined?

323 Name the official drugs which belong to the following natural orders:—Polygonaceæ, Simarubaceæ, Loganaceæ, Thymelaceæ, Anacardiaceæ, and Polygalaceæ.
324 What is assafœtida?
325 Where are the Punjaub, Affghanistan, Smyrna, Molucca Islands, Penang, Abyssinia, Malaga, Mogadore?
326 How is assafœtida collected?
327 What kind of appearance does assafœtida present when broken?
328 What is the action of light upon it?
329 With what is it often adulterated?
330 What per cent. of volatile oil is contained in assafœtida?
331 Name five official preparations which contain assafœtida.
332 How would you distinguish galbanum from ammoniacum.
333 From what source is galbanum obtained?
334 What are the therapeutic properties of galbanum, assafœtida, ammoniacum, and conii.
335 Nameall the official drugs which belong to the natural order Euphorbiaceæ.
336 What are the natural order of cardamoms, colocynth, and digitalis?
337 Which is the better ammoniacum, the tears or the lump?
338 Name the official preparations containing ammoniacum?
339 For what are the following fruits official:—anise (dil.), fennel, coriander, caraway?
340 What is the small disc surmounting the fruits called?
341 Where are Molucca Islands?
342 How is oleum cajuputi obtained?
343 To what is the green colour of the oil due?
344 With what is the oil frequently adulterated?
345 From what source is pomegranate root bark obtained?
346 Name three root barks which are used in medicine.
347 What kind of a fruit is the pomegranate?
348 Name two barks frequently used to adulterate pomegranate root bark, and state how you would distinguish them.
349 Name six official cremocarps.

0 What per centage of tannic acid is contained in pomegranate root bark?

1 Name four official berries.

2 What kind of fruit is colocynth?

3 In what way does a pepo resemble a berry, and in what does it differ?

4 How many varieties of colocynth are there in commerce? and state which is the best.

5 Why is the pulp ordered to be freed from the seeds?

6 About what per centage of seeds is contained in colocynth fruit?

7 How would you distinguish the different varieties?

8 To what does colocynth owe its activity?

9 Name all the official preparations of colocynth.

0 Give the botanical names and natural orders of canella alba, Tampico jalap, scammony root, sambuci flores, fig, and mastiche.

1 Name all the official drugs which come under the natural order Cinchonaceæ.

2 Name all the official Hesperidia.

3 From what source is elaterium obtained?

4 Describe the process of its collection, and state why light pressure only is ordered.

5 In what part of the fruit does the elaterium principally reside?

6 Why is it called squirting cucumber?

7 How many kinds of elaterium are known in commerce, and which is the best?

8 Name two substances used to adulterate it.

9 How would you estimate the quality of elaterium?

0 How would you extract its active principle, and what per centage should it yield?

1 What kind of a root is ipecacuanha?

2 In what portion of the root does the active principle entirely reside?

3 What are the smooth portions often seen in a sample of the root?

4 How many varieties of ipecacuanha are there? Name them.

375 State which is the best, and give the per centage of cortical portion and meditullium in a good specimen.
376 Name two adulterations with characters.
377 What per centage of emetine is contained in the root?
378 In what state does the emetine exist?
379 Name four official preparations which contain ipecacuanha.
380 What are the natural orders of cotton wool, mentha viridis, guaiaci lignum, granati radicis cortex, hordeum decorticatum, galls, and lavandula?
381 Name three official drugs which belong to the natural order Myrtaceæ.
382 How would you distinguish the pale catechu from the black?
383 From what source is the pale obtained?
384 Which kind of catechu is known in commerce as terra japonica?
385 Will pale catechu sink or float in water? How is it prepared?
386 What per centage of tannic acid is contained in the pale catechu?
387 Is this tannic acid of a different variety to the ordinary kind? If so, state how you would distinguish them.
388 Name four official preparations containing pale catechu.
389 Which valerian is the best, the wild or cultivated?
390 When should valerian be collected, and why?
391 Name which of the following drugs are rhizomes and which roots:—helleborus niger, valerian, arnica, serpentary, male-fern, ginger, podophyllum, aconite.
392 Does the volatile oil exist ready formed in the wood?
393 For what purpose is valerian official? Give all its preparations.
394 What is pellitory of Spain?
395 How would you distinguish pellitory from dandelion?
396 Is pellitory official? What is its composition and therapeutics?
397 What part of the plant is santonica?
398 Why has it received the name of worm seed?
399 How many varieties of santonica are there? which is the official?

400 Why are the others not used?
401 How would you recognise the official kind from the rest?
402 To what does santonica owe its active properties?
403 Which chamomile flowers are official, the single or double?
404 How would you distinguish between the two?
405 Which yields the most volatile oil?
406 What is the circular green body at the base of each flower head?
407 What is the difference between thalamus and receptacle?
408 Which are the florets of the ray, and the disc? Which of the two are pistillate only?
409 Where are the bracts called paleæ situated?
410 Name two adulterations of chamomiles; give their botanical names, and state how they may be distinguished from the true chamomiles.
411 Name the official preparations of chamomiles?
412 Where are Calabar, Cape of Good Hope, Singapore, Siam, Malabar, and the Bahama Islands?
413 What are the natural orders of myristica, rhamnus catharticus, sarsæ radix, serpentariæ radix, and uvæ ursi folia?
414 Is the fresh or dried root of dandelion official, and for what purpose?
415 When should taraxacum be collected?
416 Why should it not be collected immediately after a frost?
417 Of what kind of vessels are the concentric ring composed in a transverse section of taraxacum?
418 Does the active principle reside in the woody portion or in the juice?
419 In what portion of the root does the juice entirely reside?
420 Name three official preparations of taraxacum.
421 Name the natural orders which belong to the sub-class Monochlamydeæ.
422 Name eight official drugs which belong to the natural order Rosaceæ.
423 Is arnica root a true root or a rhizome?

424 Are arnica flowers official? Are they considered as efficacious as the root?

425 For what purpose is arnica official?

426 What portion of the plant of lobelia is official?

427 In what form is lobelia generally imported?

428 What alkaloid is found in lobelia, and what is there particular about it?

429 What are the properties of arnica, lobelia, and uvæ ursi?

430 Name two official preparations of lobelia.

431 What are the botanical names of bearberry leaves, monkshood, thorn apple, bitter apple, and dandelion?

432 With what are uvæ ursi leaves frequently adulterated?

433 How would you distinguish this adulteration?

434 To what do bearberry leaves owe their activity? Give the per centage.

435 Is uvæ ursi official? if so, for what purpose?

436 Give the natural orders of cinnamon, caraway, assafœtida, cassia, sumbul radix, camphor, and nectandræ cortex.

437 Is benzoin a true balsam? Why?

438 How is benzoin collected?

439 How many kinds of benzoin are known in commerce? State which is the best.

440 How would you distinguish the best from the inferior?

441 Name three drugs which, when broken, present an amygdaloid appearance.

442 Which kind of benzoin has the impression of a cloth upon it?

443 What is meant by the terms head, belly, and foot benzoin? State the difference between them.

444 What per centage of acid does it yield?

445 Give three or more ways of preparing the acid.

446 Will tincture of benzoin mix with water? Why?

447 Where are Siam and Sumatra?

448 What are the principal characters of the sub-class Corollifloræ.

449 What are the natural orders of marigold, laurocerasi folia, sennta indica, and amygdala amara?

450 Name all the drugs imported from Mexico.

QUESTIONS IN MATERIA MEDICA.

1 How many varieties of manna are there?

2 What is the difference between flake manna and manna in sorts?

3 What is the cause of the flat appearance seen on one side of a piece of manna?

4 What per centage of mannite is contained in manna?

5 Name the drugs which belong to the following natural orders:—Styraceæ, Oleaceæ, Asclepiadaceæ, Loganiaceæ, Gentianaceæ, Convolvulaceæ.

6 With what is hemidesmus root likely to be mistaken?

7 How would you distinguish them?

8 Name a substance contained in hemidesmus root?

9 What root is the so-called Indian sarsaparilla?

0 For what purpose is hemidesmus official?

1 Is nux vomica as seen in commerce the fruit or the seed?

2 What is the little mark seen in the centre of the concave side?

3 What name is applied to the ridge which runs from the centre to the circumference of the seed?

4 At the termination of this ridge at the circumference is seen a small protuberance; what is it?

5 Does nux vomica contain any albumen? if so, what kind is it?

6 When split open two small projections are seen, one resembling a small ovate leaf. Give the names of these, and state which of the two resembles the leaf.

7 Name *two* alkaloids found in nux vomica seeds.

8 State which is the most poisonous, and the per centage they contain.

9 With what are the alkaloids combined in the seeds?

0* What is brucia considered to be, if not a distinct alkaloid?

1 Is brucia poisonous?

2 To what is the poisonous property of nux vomica bark due?

3 Give two tests which will distinguish brucia from strychnia.

4 Name two official preparations of nux vomica.

5 Are St. Ignatius' beans official; if so, for what purpose?

476 How would you distinguish St. Ignatius' beans from nux vomica?
477 What per centage of strychnine do they contain?
478 Do they contain any brucia?
479 How would you distinguish gentian root from belladonna root?
480 What three portions are visible in a transverse section of gentian root?
481 Name four official preparations of gentian?
482 To what is the bitterness of gentian due?
483 What part of the chiretta plant is official?
484 Where is it cultivated?
486 How is it imported?
487* Name an adulteration of chiretta, and state how you would detect it.
488 What is the bitter principle contained in chiretta?
489 Where is scammony cultivated?
490 What peculiarity is there about the root? is it official, and for what purpose?
491 What per cent. of resin and gum does it contain?
492 When is scammony root the richest in resin?
493 What is scammonium?
494 How is it obtained?
495 For what purpose is scammony sometimes covered externally with chalk?
496 Describe the fracture of a good specimen of scammony?
497 What is the cause of an emulsion being formed when touched with the moistened finger?
498 How would you detect chalk occurring as an impurity in scammony?
499 How would you detect starch in scammony?
500 Give two or more means of detecting guaiacum resin in scammony,
501 Give the best means of detecting and estimating the amount of earthy matter in a specimen of scammony?
502 Is scammony entirely volatile on ignition?
503 How would you detect jalap resin when mixed with scammony resin?

504 What per cent. of resin should a good sample of scammony yield?
505 For what purpose is scammony official?
506 For what purpose is scammony resin official?
507 Is jalap a tuber or a tubercule?
508 From what source is it obtained?
509 Give the characters of a good specimen of jalap.
510 By what name is the official jalap known in commerce?
511 Name two adulterations of jalap.
512 How would you distinguish tampico jalap in powder from the official jalap in powder?
513 Give the characters of tampico jalap.
514 What per cent. of resin is contained in the true jalap?
515 How is jalap resin prepared?
516 How is scammony resin prepared? give two ways.
517 What proportion of jalap is contained in the pulvis jalapæ co. and tinctura jalapæ?
518 What is the natural order and botanical name of woody nightshade.
519 When should it be gathered?
520 What is the cause of its extreme lightness?
521 Name an alkaloid it contains.
522 For what purpose is it official?
523 What is the so called Guinea or pod pepper?
524 Give its natural order and habitat.
525 What parts of belladonna are official?
526 When should the leaves be gathered?
527 With what root is belladonna likely to be confounded?
528 What alkaloid is obtained from the root?
529 In what state does the alkaloid exist in the root?
530 Which is the most powerful, the root or the leaves?
531 Name the official preparations of the leaves and the root?
532 What is the botanical name of thorn apple?
533 What alkaloid exists in stramonium seeds?
534 With what other alkaloid is it identical in composition and properties?
535 Are stramonium leaves official? if so, for what purpose?
536 Which are official. the dried or the fresh leaves of hyoscyamus niger?

537 Are the leaves of the annual or biennial official?

538 How would you distinguish between a tincture prepared from the annual and the biennial leaves?

539 What is the difference in properties between belladonna and hyoscyamus?

540 To what are the active properties of henbane due?

541 Name a preparation obtained from the fresh leaves, also one obtained from the dried leaves.

542 What is the natural order of digitalis?

543 Where is it cultivated, and into what preparations does it enter?

544 When should the leaves be gathered?

545 Name three adulterations of digitalis.

546 Which of the adulterations possess a fetid odour?

547 How would you distinguish digitalis from its adulterations?

548 To what do digitalis leaves owe their activity?

549 From what sources are the following oils obtained:—oil of rosemary, lavender, peppermint, and spearmint?

550* To what sub-class does rhubarb belong?

551 From what source is the official rhubarb obtained?

552 When should rhubarb be collected, and why?

553 For what purpose are the holes made in rhubarb?

554 Which of the rhubarbs is now seldom met with in commerce?

555 Name all the official varieties of rhubarb.

556 Is the English official?

557 Give the principal characters of the Russian.

558 Give the principal characters of the East Indian.

559 Give the principal characters of the Dutch trimmed.

560 How would you distinguish the English from the other varieties?

561 Which kind contains the most raphides?

562 Which kind contains the least raphides?

563 What are raphides?

564 From what source is English rhubarb obtained?

565 With what is powdered rhubarb frequently adulterated?

566 How would you detect the presence of turmeric when mixed with powdered rhubarb?

7* Give the composition of rhubarb, and state to what the activity is due.
8 What is the difference in properties between large and small doses?
9 Is the nutmeg as used the entire fruit or seed only?
0 Where do nutmegs come from?
1 To what is the veined appearance due when cut?
2 What kind of albumen has a nutmeg?
3 Name four kinds of nutmegs, and state which is the best?
4 From what source is the long nutmeg obtained?
5 What is mace?
6 What is the difference between an arillus and arillode?
7 How is mace preserved?
8 What is the composition of nutmegs?
9 Name an official preparation which is made from the volatile oil.
0 What portion of the bark is cinnamon?
1 Give its habitat and botanical name.
2 How is it that cinnamon occurs in a number of quills?
3 Name a bark principally used to adulterate cinnamon, and give the best means of distinguishing them.
4 How would you detect cassia bark in powder when mixed with powdered cinnamon?
5 State which contains tannic acid.
6 Does cinnamon bark contain cinnamic acid?
7 Are cassia buds official? What are they?
8 With what are they likely to be mistaken?
9 What is camphor? How is it obtained?
0 To what extent is it soluble in water?
1 Give the best means of powdering it.
2 Is camphor ever adulterated?
3 Name another kind of camphor often met with.
4 From what source is it obtained?
5 How is artificial camphor obtained?
6 What proportion of camphor is contained in the water liniments, spirit, and tincture?
7 From what source is sassafras obtained?
8 Which is the most active portion of the plant?

599* Give the composition of sassafras.
600 From what source is bebeeru bark obtained?
601 Where are British Guiana and Java?
602 What alkaloid is contained in bebeeru bark, and to what extent?
603 For what purpose is the bark official?
604 Is serpentary root a true root or rhizome?
605 Name the official preparations of serpentary.
606 To what is the bitter substance of serpentary due?
607 Give the natural order of mezereon bark.
608 State which is official, the bark of the stem or the bark of the root.
609 How would you distinguish the bark of the daphne mezereum from the bark of the daphne laurola?
610 State which is principally found in commerce?
611 For what purpose is it official?
612 What are the great characters of cascarilla bark?
613 From what source is it obtained?
614 How would you distinguish it from pale cinchona bark?
615 Is croton oil a fixed or a volatile oil?
616 How would you distinguish croton seeds from castor oil seeds?
617* What proportion of nucleus, shell, and oil do they contain?
618 How many kinds of croton oil are known in commerce?
619 State how you would distinguish the two kinds.
620 What acid is contained in croton seeds?
621 Is castor oil a fixed or a volatile oil?
622 What is the small protuberance seen at one end of the seed?
623 In what does castor oil differ from most other fixed oils?
624 What is meant by the term cold-drawn?
625 Are the testæ of the seeds injurious when taken internally?
626 What is kamala? Where is it imported from?
627 What is the light coloured powder mixed with kamala? How can it be separated?
628* What does kamala contain?
629 What are the properties of kamala?

630 What kind of a fruit is black pepper?
631 What is the difference between the white and black?
632 When should black pepper be gathered?
633 What is the composition of pepper?
634 For what purpose is pepper chiefly used?
635 For what purpose is it official?
636 How would you distinguish between cubebs and black pepper?
637 Name the drugs which contain the following active principles:—cubebin, piperine, rottlerine, and beberine.
638 From what source are matico leaves obtained?
639 How would you distinguish matico from digitalis?
640* Name an adulteration of matico.
641 What are its properties and official preparations?
642 Which portion of the bark is elm bark?
643 When should it be collected?
644 What is its composition and official preparation?
645 What per cent. of tannic acid does it contain?
646 From what portion of the tree is the official oak bark collected?
647 Give its botanical name and natural order.
648 When should it be collected and why?
649 What per cent. of tannic acid does it contain?
650 What are its properties and official preparation?
651 What are galls? How are they produced?
652 What is the cause of the holes seen in galls?
653 Which are considered the best, those with or those without holes?
654 How many varieties are there in commerce? State which is the best.
655 What per cent. of tannic and gallic acid do galls contain?
656 What is prepared styrax? How is it obtained?
657 In how many forms does styrax occur?
658 State which is official.
659 Of what does the solid storax consist?
660 Is storax a true balsam? if so, why?
661 From what portion of the plant is Indian hemp obtained?

662 What name is applied to the resinous exudation?
663 What is the difference between the hemp plants grown in England and those grown in India?
664 Name two official preparations of this drug.
665 What is the hop? Where is it cultivated?
666 Describe a strobile. Where is the lupuline situated?
667 To what is the bitter principle due?
668 What per cent. of resin is contained in hops?
669 Name three official preparations of hops.
670 What is resin obtained from?
671 From what is Canada balsam obtained?
672 Is it a true balsam, and why?
673 Of what does it consist?
674 What is common frankincense?
675 What is Burgundy pitch?
676 Of what does the commercial article principally consist?
677 Give a test which will distinguish between the spurious and the genuine.
678 For what purpose is it official?
679 For what purpose is tar official?
680 Is oil of juniper a fixed or a volatile oil?
681 Is juniper berry a true berry or a galbulus? State the difference between the two.
682 What is the tri-radiate groove seen on the top of the fruit?
683 How would you distinguish between juniperus communis and juniperus sabinæ?
684 When should savin tops be collected?
685 To what do savin tops owe their activity?
686 Name three official preparations of sabinæ.
687 Give the botanical names of the following:—larch bark, ginger, cardamoms, turmeric, saffron, and sarsaparilla.
688 How would you recognise larch bark?
689 To what does it owe its activity?
690 Name an official preparation of larch bark.
691 Is gum juniper official; for what purpose is it used, and from what source is it obtained?
692 With what is it likely to be mistaken?
693 From what is huile de cade obtained?

694 What portion of the plant is ginger?
695 When should ginger be collected?
696 Name two varieties found in commerce, and state which is the better.
697 What is meant by uncoated ginger?
698 How are the darker kinds of ginger bleached?
699 Upon what does the pungency depend?
700 How many kinds of cardamoms are there?
701 Which is the best?
702 What kind of dehiscence has the cardamom capsule?
703 What per cent. of oil do they yield?
704 Why are the pericarps ordered to be rejected?
705 Where are Malabar and Ceylon?
706 What is the action of alkalies on turmeric?
707 What portion of the plant of crocus sativa is official?
708 What is hay-saffron?
709 What is cake saffron?
710 Name *five* adulterations of saffron, and state how you would detect the presence of each?
711 Is saffron official? if so, for what purpose?
712 Name the two divisions of sarsaparilla.
713 Name the four mealy kinds.
714 Name the three non-mealy.
715 State which is official.?
716 How would you prove that the smilacine resides entirely in the woody zones?
717 How would you distinguish between the mealy and non-mealy?
718 State which of the following are mealy:—Vera Cruz, Lima, Brazilian, Jamaica, Honduras, and Guatemala.
719 How would you distinguish the Jamaica from the other kinds?
720 Name a substance contained in sarsaparilla which is contained also in rhubarb?
721 Why is sarsaparilla ordered to be cut transversely?
722 Is squill a corm or a bulb? State the difference between the two.
723 How many varieties are there?
724 Which is considered the best?

725 Why is squill not kept in the bulb?
726 Why should squill be kept in a bottle?
727 Name a poisonous principle found in squill.
728 What is the diuretic principle of squill?
729 What is the difference in strength between the fresh and dried powder?
730 What are aloes?
731 How are Barbadoes aloes collected?
732 How would you distinguish Barbadoes from socotrine?
733 Which is considered the best kind?
734 Where are Barbadoes, Socotra, and Mexico?
735 Give the principal characters of socotrine by which it may be recognised.
736 Is hepatic aloes official?
737 To what is the opacity of hepatic aloes due?
738 What is the difference between the socotrine and hepatic?
739 From what source is Cape aloes obtained?
740* What is the composition of aloes?
741 What is the difference between the amorphous and crystalline aloin.
742* Is aloin a glucoside?
743* Which acid is it that acts upon aloin?
744* What is formed when nitric acid acts upon nataloin?
745* What is formed when nitric acid is added to barbaloin?
746 Name three preparations in which Barbadoes aloes is used.
747 Name eight preparations which contain socotrine aloes.
748 What is meadow saffron?
749 When should colchicum autumnale be collected?
750 Is colchicum biennial or annual?
751 What is there peculiar about the colchicum plant?
752 What is the concavity due to on the slices of the corms?
753 Name an adulteration of colchicum, if any.
754 What alkaloid is contained in the seeds and corms?
755 In what state does it exist?
756 State which parts of the plant are used in preparing the following:—extract, tincture, and wine.

757 What are the properties of colchicum ?
758 What is the composition of male fern ?
759 Name an official preparation.
760 What is ergot ?
761* Of what does ergot consist ?
762* Name the three phases in the development of ergot.
763 To what does ergot owe its properties ?
764 What per cent. of this substance does it contain ?
765 What per cent. of fixed oil does it yield?
766 What is cevadilla?
767 What kind of a fruit is it ?
768* How would you distinguish colchicia from veratria ? Give four ways.
769 For what purpose is green hellebore official ?
770 Is it a root or rhizome ?
771 With what is the veratria combined ?
772 How would you distinguish the three kinds of hellebores ?
773 In what does the white differ from the green ?
774* Give three or four ways of preparing podophyllum resin.
775* What proportion of podophyllum resin B. P. is soluble in ether ? State to what the yellow colour of the resin is due.
776* What per centage of aconitia is obtained from aconite root ? Will aconitia give a precipitate with perchloride of platinum ?
777* From what source is pseudo-aconitia obtained ? and state how you would distinguish it from aconitia.
778* With what is aconitia frequently adulterated or mixed ?
779* Is morphia soluble in ether, chloroform, or liquor potassæ ?
780* How may codæia be separated in the manufacture of morphia from opium ?
781* Give three tests which will distinguish codæia from morphia.
782* How would you distinguish between narcotine, thebain, and codæia ?
783* Is meconine an alkaloid ? Why ?

784* How would you distinguish myrosin from ordinary albumen?

785* From what portion of the seeds is the fixed oil of mustard obtained?

786* What is the cause of soap frothing when mixed with water?

787* What is the action of liquor potassæ on gambogic acid?

788* What is the action of nitric acid on guaiacic acid?

789* Name the volatile oil which is most soluble in water.

790* What is the action of liquor potassæ on myrrh?

791* Name the best test for the purity of copaiba.

792* Which of the two resins of cusparia is soluble in liquor potassæ, the hard or soft? and which gives the red colour with nitric acid?

793* What is formed when gum acacia is treated with nitric acid?

794* Is the glycyrrhizin the sweet principle of liquorice root?

795* Give the best mode of detecting alcohol in bals. Peru.

796* How could you convert cinnamic acid into benzoic acid?

797* How would you obtain the volatile oil from bals. Peru?

798* How would you detect styrax occurring as impurity in bals. Peru?

799* Give a good method of extracting amygdalin from bitter almonds?

800* What per centage do they contain?

801* Name another official drug which contains amygdalin, and its per centage.

802* Give a mode of separating the two oils of which oleum caryophylli is composed.

803* How would you detect phenol occurring as impurity in oil of cloves?

804* Which of the two oils is Eugenic acid?

805* With what is Maltese elaterium coloured?

806* How would you detect colocynth seeds in the extract of colocynth?

807* Describe the process for extracting colocynthin.

808* Has conia acid or basic properties when mixed with water?

809* What is formed when it is brought into contact with the fumes of nitric or hydrochloric acid?

810* What action has the atmosphere upon conia?

811* How has the alkaloid conia been artificially made?

812* Of what does the insoluble portion consist when black catechu is treated with water? What per centage is soluble?

813* How would you estimate the amount of tannic acid in catechu?

814* How would you distinguish pale cinchona from cascarilla?

815* Why is chloroform used in estimating the cinchonas?

816* For what purpose is the lead used in estimating cinchona for quinine?

817* Describe Carle's and De Vrij's process for the estimation of cinchonas; state which you consider the better, and in what they differ?

818* How would you detect amorphous quinine when mixed with the crystalline quinine? State which is the better preparation.

819* What per centage of emetine is contained in ipecacuanha?

820* Give the best means of extracting it.

821* In what menstrum is it soluble?

822* Give the composition of volatile oil of valerian.

823* How would you prepare valerianic acid, valerine, and valerol, from valerian root?

824* What is the milky juice of taraxacum?

825* How is taraxacin extracted?

826* With what is arnica rhizome frequently adulterated? How would you detect the adulteration?

827* Name a substance which exists in the flowers but not in the root of arnica.

828* How is santonin extracted?

829* Name a good solvent of santonin.

830* What decomposition takes place when santonin is exposed to the air?

831* Give three means of distinguishing between spurious and genuine manna.

832* Is mannite the purgative principle of manna?

833* What is mannite? Give its formula.
834* Is olive oil obtained from the fruit or seeds?
835* Name the best and worst quality of olive oil.
836* What is the cause of the impure oil going rancid?
837* To what is the odour of rancid oil due?
838* Of how many portions does olive oil consist? name them, and state the per centage of each. At what temperature does it congeal and liquify?
839* How would you obtain oleic acid from olive oil?
840* How would you prepare strychnine from brucia?
841* Give two or more tests for strychnia, and the best antidote to be given in case of poisoning by this alkaloid?
842* How would you distinguish between hyoscyamine and atropia?
843* Will hyoscyamine decompose when distilled?
844* What per centage of digitalin is contained in digitalis?
845* Give a good method of extracting digitalin.
846* How many resins are contained in rhubarb? Name them.
847 How would you estimate the amount of raphides in a sample of rhubarb?
848* What per centage of fixed and volatile oils do nutmegs yield?
849* How could you remove the bitterness of bebeeru bark?
850* Is the sp. gr. of camphor always the same; under what conditions does it vary?
851* How would you distinguish between Borneo and laurel camphor?
852* How is the volatile oil of cinnamon obtained?
853* What is the action of nitric acid on the volatile oil?
854* How many kinds of castor oil are there? Which is the best?
855* How would you distinguish piperin from cubebin?
856* How are hops propagated?
857* What is formed when hops are distilled with water?
858* How is lupuline extracted?
859* When does oak bark contain the most tannic acid?
860* What is formed when resin is burnt without access of air?

861* What is the definition of the terms proximate and ultimate analysis?
862* How is smilacin prepared?
863* What takes place when the volatile oil of cardamoms is placed in contact with iodine?
864* What is the colouring matter of saffron?
865* How are the crystalline and amorphous aloins prepared?
866* What is the action of nitric acid on barbaloin, socaloin, and nataloin?
867* What is formed when aloes is heated with liquor potassæ?
868* Give two views of the composition of ergotin.
869* How is ergotin extracted?
870* How is secalin prepared?
871* What is carmine? How is it prepared?
872* What is lake?
873* Why is aloin believed not to be an alkaloid?

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WESTMINSTER COLLEGE

OF

CHEMISTRY AND PHARMACY.

LAMBETH ROAD, LONDON, S.E.

Analytical Laboratory and Lecture Hall:—

NORTH STREET, KENNINGTON ROAD, S.E.

The largest School of the kind in London.

◆

Director—MR. GEORGE S. V. WILLS, M.P.S.

Secretary—Mr. JOHN GOODE.

This College was founded in 1871, in order to provide Lectures, Classes, and a thorough course of Analysis adapted to the requirements of Pharmaceutical Students.

During the Session of 1876-1877, 105 Students passed the Major, Minor, and Modified Examinations; 151 the Preliminary; and 187 the Apothecaries' Hall, from this Institution.

The LABORATORY and LECTURE HALL are large, commodious, well ventilated, and properly heated; much expense has been entailed in securing a first-class set of specimens, and no pains have been spared to enable the Students to advance themselves in the several branches of study.

The Lectures are suitable to the highest requirements of the Pharmaceutical Student, are rendered doubly interesting by the fine collection of specimens placed at the disposal of the Lecturers, and are equal to any similar course in England. The Lecturers are of the highest standing, and devote all their energies to their work.

The Session extends from September 1st to July 20th, and Two Classes of Students are received.

Class A.

For students desiring a full ten months' course of instruction in Chemistry, Botany, Materia Medica, and practical Chemistry as applied to food and drugs.

Class B.

For students desirous of obtaining a thorough practical knowledge of the subjects required in the Major and Minor Examinations of the Pharmaceutical Society. Term from one to three months, according to the amount of the student's previous knowledge.

The course of instruction being thoroughly practical, students are prepared in a much shorter time and at half the expense than at any other school.

Arrangements are made for the accommodation of 150 pupils.

To prevent disappointment, students should register their names a month or two in advance.

Lectures.

During each session 400 lectures are delivered on the following subjects :—

1. LATIN. On the reading of autograph prescriptions, parsing, and rules of grammar.
2. DISPENSING. The best modes and excipients for forming pills, powders, emulsions, mixtures, plasters, &c.
3. PHARMACY. Principles of the processes of the Pharmacopœia preparations, doses, and administration.
4. BOTANY. The structure of roots, stems, leaves, seeds, fruits, flowers, inflorescences, and cells. The classification of the Linnæan and De Candolle's systems, illustrated with the microscope and coloured diagrams.
5. MATERIA MEDICA. On the characters of the different natural orders, geographical sources, detection of adulterations, and modes of extracting their active proximate constituents in a separate state, and their tests.
6. CHEMISTRY. The theories of chemistry, the metals and basylous *radicals*. Equations of the different decompositions, oxygen, nitrogen, sulphur, carbon, phosphorus, arsenic ; their oxides, acids, and salts,

ammonia, alcohols, bromides, iodides, chlorides, glucosides, and their derivatives. The taking of sp. gravities, temperatures, and measurement of gases. The qualitative analysis of chemicals. Volumetric and gravimetric analysis of the B. P. solutions, organic and inorganic chemistry.

7. On the properties of light, heat, electricity, and magnetism. Illustrated by experiments.

Text Books.

Attfield's Chemistry. Bentley's Botany.		
Wills' Vegetable Materia Medica, with map of Habitats and coloured plates	„	10/6
„ „ „ with uncoloured plates	„	8/6
Wills' Elements of Pharmacy	„	6/6
Wills' Handbook to Practical Analysis ...	„	2/
Wills' Handbook of Decimals, Metric System and Physics	„	1/
Wills' Preliminary Exercises	„	1/6

The whole of the Apparatus required for Practical Chemistry is lent by this Institution.

In the event of any being broken or destroyed, the student has to replace it.

Each bench is furnished with gas and water.

Everything is done to economise the cost to students, and make them comfortable while at school.

All chemicals found by the Director, except nitrate of silver, which the student can purchase in the school.

FEES.

Preliminary Course.

One Month, £2 2s., or until qualified £5 5s.

Minor Course.

One Month, £3 3s. 3 Months, £7 7s.
Inclusive fee until qualified, £10 10s.*

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* For this fee a student can attend until qualified as a Pharmaceutical Chemist.

A fraction of a month being charged at the same.

Fee to old students according to arrangement.

Accommodation is provided for resident pupils. Terms, £1 1s. per week.

Students can enter at any time and for any period.

PRIZES

An Examination is held in February, June, and December in each year.

1st prize.—Silver Medal of the College, with free tuition for the Major Examination.

2nd.—Bronze Medal and Certificate.

3rd.—Certificate of Honour.

Conditions.

1. Students who have passed the Minor Examination are not allowed to compete.
2. Each student must have attended the College at least two months.
3. Any student being absent more than *three* times during the month previous to the Examination, *without* satisfactory reasons for the same, will not be eligible to compete.

Certificates of attendance are awarded to all diligent students.

Time of Study.

Minors, 9 till 4; Majors, 9 till 6, except Saturdays, when the school closes at 2 p.m.

In addition to the daily classes, a written examination is given for home work.

Every pupil is passed through the Apothecaries' Hall Examination before leaving this Institution, free of cost.

Botanical excursions are made every Saturday during the season at 2 p.m.

Rules.

As each student works independently, he can enter at any time.

No student allowed to be absent from the lectures or classes, without permission from the lecturer.

Conversation during lectures is strictly forbidden.

EVENING CLASSES.

Gentlemen engaged during the day, and unable to leave business, may be prepared for the various examinations in the evening as under:

Majors.

Monday, Practical Chemistry, 7 till 9. Class 9 till 10.

Minor and Modified.

Tuesday, Practical Chemistry, 7 till 9. Chemistry Class, 9 till 10.

Wednesday, „ „ 7 till 9. Materia Medica and Pharmacy, 9 till 10.

Thursday, „ „ 7 till 9. Botany and Latin, 9 till 10.

Preliminary.

Friday, 7 till 9.

Terms.

Major, One month, 8s.; Three months, £1 1s. Until qualified, £5 5s.

Minor, One month (one night weekly), 6s.; Three months, 15s. Until qualified, £4 4s.

Preliminary, One month, 4s.; Three months, 10s. 6d. Until qualified, £3 3s.

⁂ Gentlemen desirous of a personal interview, should call at the office of the school, 62, Lambeth Road, between the hours of 5 and 8 p.m.

SYLLABUS OF

WILLS' UNIVERSAL POSTAL SYSTEM

FOR THE

Major, Minor, Modified, Apothecaries' Hall, and Preliminary Examinations, &c., &c.

THE fact that a very large proportion of students fail to pass the examinations of the Pharmaceutical Society, even in many cases after very diligent self-preparation, shows most clearly the *absolute necessity* of a DEFINITE SYSTEM OF INSTRUCTION.

Among these rejected candidates, some of whom in the bitter disappointment of failure throw up all hope of a medical career, and betake themselves to other paths in life, there are no doubt many who, had their studies been directed by a competent and intelligent master, or pursued in accordance with a systematic and definite plan, would not only have passed their examination with ease and credit, but might also have become honoured and distinguished members of the profession they aspired to join.

Many a Faraday, many a Humphrey Davy, may have retired disheartened from the examination room, rejected, not from a lack of the necessary application and industry, and with capabilities sufficient, if rightly directed, to enable him to make a name in the world, but only and solely because in his preparations and studies he has been without the guidance and advice which the experience of others might have given him, and has as an inevitable result, while tediously mastering many subjects not necessary for him to know, omitted to inform himself in certain indispensable branches absolutely essential for his success.

.This systematic training which we see is so conducive to a successful course of study may best be obtained by a residence for a longer or shorter period at such an Institution as the Westminster College; but to those who are unable at present to carry out this plan, and more especially to gentlemen wishing to prepare themselves for the PRELIMINARY EXAMINATION, *Wills' Postal System of Instruction* will be found of the very greatest service.

This system has now been in operation for some years, and has been found to be a most complete and unbounded success. By its means a student residing in any part of the kingdom may be prepared with equal facility with those who, living in London or other large cities, are able to attend a regular school of instruction, and that this system is eminently applicable to country students is proved by the fact that *Mr. Wills passes a larger number of candidates* at every examination *than any other school or college whatever*, and that a large proportion of these pupils have been prepared solely by the POSTAL SYSTEM. Their satisfaction at its results is testified by the laudatory testimonials Mr. Wills is constantly receiving, copies of which will be forwarded for perusal.

Mr. Wills has therefore been induced to expand and enlarge his Postal System, in order to extend to gentlemen preparing for the Preliminary Examination those advantages which have been so greatly valued and appreciated by students in the higher divisions.

PRELIMINARY DIVISION.

Fee—HALF-A-GUINEA.

This Course consists of 100 Printed Lectures, in the production of which no expense or pains have been spared. They have been carefully revised in order to embrace those changes and alterations in English and Latin Grammar which have been made by modern grammarians, and MR. WILLS has no hesitation in stating that after a careful study of these Lectures a candidate is absolutely **CERTAIN OF SUCCESS.**

Special attention has been paid to those subjects in a knowledge of which students are generally found deficient, especially LATIN GRAMMAR AND PARSING, ENGLISH ESSAY WRITING, AND THE METRIC SYSTEM OF WEIGHTS AND MEASURES, while the lectures containing hints to intending candidates will be found of the very greatest practical utility.

In order to bring these lectures within the reach of all students, the Fee for the whole course has been fixed at Half-a-Guinea.

MINOR DIVISION.

WESTMINSTER COLLEGE OF CHEMISTRY & PHARMACY

Fee—ONE GUINEA.

The course is divided into 150 Lectures, treating on the various subjects required in the examinations of the Pharmaceutical Society, The following are sent to each Pupil:—500 Valuable Autograph Prescriptions, collected from all parts of England, 100 difficult (lithographed) formulæ for Mixtures, Emulsions, Pills, Liniments, &c., for practical Dispensing, all of which have been given in the previous Minor Examinations, with full directions how to dispense them, 100 Dried Botanical Specimens, 250 Coloured Botanical Plates, Powders for Analysis, the action of Acids on Metals, the action of Heat upon all the B. P. Chemicals, an easy method of Drawing Equations, &c., &c.

The lectures are intended, not only to prepare the Student for Bloomsbury Square, but to give him a thorough knowledge of every drug used in the ordinary routine of business. As they treat upon every branch of the profession, they will be the means, not only of making apprentices more useful to their employers, but of furnishing them with every information necessary for the completion of an apprenticeship, and the proper performance of their duties in after life. The course of instruction is not limited to 12 months, but may be made to extend any length of time from 6 months to 4 years, free of extra cost. Arrangements are also made to supply the lectures, &c., in small books, each containing 12 lectures, so as to be of service to gentlemen intending to present themselves in 1 or 2 months from the time of entering.

PRESCRIPTION READING.—Special attention is paid to the reading of autograph prescriptions, which is so much neglected by country students, not merely from want of application, but from the fact that they seldom meet with autograph prescriptions, to such this valuable collection will be found most useful. Printed prescriptions as found in books may assist the student, but cannot suffice to qualify him for his examination as experienced by students who enter the college.

PRACTICAL DISPENSING.—These lectures treat on the best modes and excipients for forming pills, powders, emulsions, mixtures, &c., &c. *One Hundred* different formulæ are sent for the student to dispense at his leisure. No directions are given at the time of sending, but follow in subsequent lectures.

PHARMACY.—The numerous preparations in this subject which often cause great taxation of the memory is so tabulated, and the principles of the different processes so interestingly imprinted on the memory, and further impressed by a series of well directed questions, that the student cannot help but comprehend and retain them with facility.

MATERIA MEDICA.—These lectures will be found most useful in assisting the student's memory. The adulterations, natural orders, habitats, characters for recognition, &c., &c., being tabulated in such a manner as never before seen.

BOTANY being a subject somewhat difficult to master by mere book reading, the plan of teaching it is by sending to each student fresh and dried specimens, each supply of which will be found in every way equivalent to a two hours' botanical excursion in the gardens. G. S. V. WILLS has compiled a Botanical Dictionary, giving full descriptions of 200 flowers, which will answer the purpose of a demonstrator, and materially assist the learner in diagnosing different specimens; thus, this subject, generally so much dreaded and neglected by the country student, will be found, by the assistance of these Lectures, remarkably easy and pleasant, and enable him to take his walks in the fields with redoubled pleasure. These lectures are illustrated with diagrams, which render the subject easily understood. The *dried* botanical specimens and plates are to be returned under the same conditions as the lectures, but the *fresh* specimens may be retained by the student.

CHEMISTRY, Practical and Theoretical.—This subject, so much dreaded by country students, may be mastered with perfect ease. Those who are unable to do practical analysis during business may defer that portion of the instruction until such time that they can make it convenient to enter the college for a term of ONE MONTH, which time will be found sufficient, with the theoretical knowledge previously obtained. The lectures on chemical philosophy, specific gravities, densities, temperature, and instruments used are illustrated by diagrams and are easily understood.

EXAMINATION PAPERS, to test the student's progress, are forwarded monthly, each containing 100 well directed questions, easily comprehended, and quite equal to the Pharmaceutical examinations.

The time usually required is from 4 to 6 months; the length of time necessary to be devoted daily to these lectures is *one hour*.

Independent of the primary object of these Lectures, it is considered that the advantage of having a tutor to correspond with, who can solve any difficulty the student may meet with in the course of his studies, is alone worth the remuneration given.

N.B.—The student is particularly cautioned against receiving more lectures weekly than he has time to thoroughly master. A little well learned is much better than a quantity only half learnt.

STUDENTS UNDER 21 YEARS OF AGE, who enter for a term of 12 months or upwards, are permitted the privilege of paying half the fee on entry, and the remainder in six months; to such the lectures are sent weekly, fornightly, or monthly, as required.

MAJOR DIVISION.

Fee—ONE GUINEA.

This Course consists of 100 Printed Lectures, which contain all the information necessary to be known in this examination. It is a well-known fact that months of time is wasted in reading and studying matter which is not required.

The idea on which this system is based, is to arrange for each student his course of study for him, and to provide him generally with that knowledge which he needs to know.—*Chemist and Druggist*, March 15, 1877.

This course is conducted in precisely the same way as the Minor Examination. The lectures have been carefully revised, and new matter added, so as to embrace all the recent discoveries.

Mr. Wills, in order to thoroughly prepare those students who avail themselves of his Postal System in preparing for the Major and Minor Examinations of the Pharmaceutical Society, has determined (at a great expense) to circulate amongst his pupils the parts of Bentley and Trimen's Medical Plants, with coloured plates and descriptive letterpress, now publishing by Messrs. Churchill at Five Shillings per part.

Those students who wish to avail themselves of this opportunity, are requested to forward 2s. in stamps for the necessary postal wrappers.

The parts are strongly bound in cloth, and leave the College every Monday, and are to be returned in time to reach the College by the following Monday morning, enclosed in one of the special wrappers, and containing inside a fresh addressed wrapper for the next part, with a 2d. stamp affixed.

Each part contains *eight* plates, and it is expected to extend to 40 parts, so that for the trifling sum expended in postage, each student will be able to study thoroughly a most valuable book costing £10.

OPINIONS OF THE PRESS.

LONDON, *March* 15*th*, 1877.

"THE system of lecturing on pharmacy and its associated studies through the post has been developed by Mr. G. S. V. WILLS, of the Westminster College of Pharmacy, to what we regard as quite a surprising extent.

A few years ago everybody was interesting himself to a greater or less extent, in the wealthy problem of 'provincial pharmaceutical education. Essays were written, orations delivered, committees formed, and schemes proposed, with the object of elevating our educational standard *en masse.* To estimate the result of all this united and personal effort would be a melancholy and a thankless task. The success which Mr. WILLS' well-directed enterprise has met with proves that, after all, the real want was rather commercial than intellectual, and was to be met by commercial rather than by charitable or æsthetic procedure. We mean that the advancing generation of pharmacists were not as a body pining for mental culture so much as they were told. they were morally bound to be. What they wanted was the means of educating themselves sufficiently to pass the necessary examinations, so that they might have a fair prospect of an honourable living before them. Those who met this want intelligently and competently have been handsomely rewarded for their pains. Those who tried to thwart it are left with a consolatory sense of their own high-mindedness, but with little else.

In order to make ourselves fully acquainted with the details of this postal system of instruction, we recently paid Mr. WILLS a visit, quite unexpectedly to him, and obtained the most complete satisfaction of our curiosity. Everything was open to our inspection, down to the printer's bills and private accounts, and everything was in such neat order that the whole procedure could be comprehended in a few minutes.

Mr. WILLS receives postal pupils for either the Preliminary, the Minor, or the Major examinations, a different course being provided in each case. The fee being paid, the lectures are sent in rotation, generally two per week. The student having digested his one, two, or four lectures per week, as the case may be, returns them with an addressed envelope, and a new set goes off. The whole course may be extended over several years, or condensed in a few months, at the student's option, but regularity is insisted upon. Besides these lectures, which we should mention are varied in their order, the students will receive large collections of autograph prescriptions for examination, and copies of Bentley and Trimen's "Medicinal Plants" are also circulated on loan throughout the confederation. The idea on which the system is based is to arrange for each student his course of study for him, and to provide him generally with that matter which he needs to know. If he wishes it, samples of salts for analysis are also included in the course, and he is also encouraged to communicate with the College in all questions of difficulty which may occur to him.

We have explained this system at some length, because it seems to us a very interesting feature of modern English pharmacy, and when we mention that at the time of our visit Mr. WILLS had no less than 803 students on his books, and new ones coming in every day, we have said enough to show that, whether for good or for evil, the postal system is undoubtedly an influence of no small moment in pharmaceutical education."—*Chemist and Druggist.*

LONDON, *June 1st,* 1877.

"Since the real hard work for pharmaceutical examinations began after the passing of the Pharmacy Act of 1868, by virtue of which it became imperative for a stringent ordeal to be passed, and consequently required very considerable fagging up and preparation. the aspirants to pharmacy honours have, contrary to anticipation, in no wise decreased; on the contrary they have increased, inasmuch as, now that pharmacy is recognised at the hands of the State as a legitimate profession, young men from the best ranks of society have enrolled themselves under its banner to fight the good fight, and in order to meet and cope with this unexpected influx, the Society has from time to time increased the rigour of its examinations, until to-day getting through the Pharmaceutical trial is no mean accomplishment; and young men who have successfully pulled through are to be complimented on their prowess and encouraged to future exertions, particularly if these young people are to a certain extent self-instructed, that is, if they have entirely worked up and passed the examination without any ulterior assistance from those well-informed gentlemen who specially devote themselves to the preparation of students, and who by virtue of hard and conscientious labour rarely fail to pass the greater part of their pupils. If, as we before said, a young man "gets through" his examinations without this aid, then he does a great thing, but facts have determined that whereas nine out of ten students self-prepared, and highly self-opinionated with a belief in their own capabilities, lamentably fail, and to some extent therefore are the victims of personal pique and professional ridicule, not to say disgrace, the same proportion of individuals who undergo professional training at the hands of a recognised tutor pass easily. This is probably from the fact, that while the ordinary run of would-be well informed young men especially study those particular points upon which they will *not* be examined, because they have no idea what the examination consists of, the tutor who is daily preparing men for the same examination knows every in and out, and in addition to giving his pupils a good general knowledge, most especially prepares them for that running fire of questions which it will be their lot to meet at Bloomsbury Square. Probably the young man who is an assistant, or apprentice, some hundreds of miles from London, will declare with a regretful sigh that he cannot afford the time or the money to come to London and fag, and that he has no means beyond his own personal efforts therefore to rely on. We should cordially sympathise with this person, because we feel sure he would never be a successful Pharmaceutical Chemist did we not know that he has an all-sovereign balm for his woes at hand, obtainable for the expenditure of a mere trifle, and therefore leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness. Mr. WILLS, of Westminster College, Lambeth, one of our most thoroughly successful "tutors," extends him a helping hand. The postal system, which this gentlemen has introduced and carried out with the most complete success, is an extraordinary advantage to that class of pharmaceutical student to which we have more particularly referred, as it tenders him an opportunity of working at his own quarters, miles away from London, assisted by an efficient London master. We have visited Mr. WILL's establishment, and having thoroughly gone into every particular in connection with the working of the system, have much pleasure in recommending it. Specimen salts for analysis, and lectures are postly weekly from this establishment to the students in all parts of the country, and with the facilities Mr. WILLS has at command, we can scarcely wonder that the whole of his students pass without difficulty. His stock of books, lectures, diagrams, &c., which he sends to his pupils, amounts in value to hundreds of pounds, and it is therefore scarcely necessary to point out to our Readers the immense advantage such a fine library affords. The preliminary, minor, and major examinations are all treated with the postal system with equal success, and the fact that at the period of our call on Mr. WILLS he had some 900 students on his book, will clearly demonstrate the importance of the system and the support it is receiving. We cordially advise a trial of Mr. WILLS' principle, and we have every confidence the essayist will not be disappointed."—*The Magazine of Chemistry and Pharmacy.*

MANCHESTER, *March 6th,* 1877.

"The success which seems to have attended the introduction of this novel system of preparing students for Bloomsbury Square proves that it supplies a want much needed, and anyone who will take the trouble to ascertain the *modus operandi* of Mr. WILLS' excellent system, will be astonished by its originality and completeness.

We can readily understand what a boon it must be to many employers who can ill spare their apprentice, or assistant, that they can, without leaving their counters, become pupils of Westminster College, with every probability of gaining the envied title of 'Pharmaceutical Chemist.' Not that we should presume to assert that an epistolary mode of instruction can equal an oral; yet, the results of the number of students who have pased at the Pharmaceutical Society's examinations, and who have studied under Mr. WILLS' Postal System, averaging five out of every six, we are informed, goes far to show that much may be done by it, and speaks volumes for its efficiency.

We have had an opportunity of inspecting the arrangements made at the Westminster College for carrying out this mode of instruction, and are not at all surprised that Mr. WILLS has the boldness to print on his prospectus, 'Success Guaranteed.' The manner of teaching adopted by this system is certainly too sound to have the slightest character of cramming, unless it be that it crams the student with the knowledge requisite to pass the stiff examinations at Bloomsbury Square, and to perform the duties of a pharmacist creditable to himself, and with satisfaction to the public, and no system can accomplish more. To an ardent, anxious pupil, we believe there is a short cut from Westminster College to Bloomsbury Square, and that any student can become a Pharmaceutical Chemist if he *Wills* it."—*Mather's Illustrated Price Current.*

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In this work Mr. Wills believes that the want alluded to above will be found to be supplied, especially as, from his position as Principal of the Westminster College of Chemistry and Pharmacy, he has been enabled to ascertain the peculiar wants of his students in these matters.

The author believes that the diagrams in this work, both those explaining the Metric System and those illustrating the Physics, will be found of great utility, especially as this is, he thinks, the only work published in the Kingdom in which the principles of the Metric System have been illustrated pictorially, thus rendering a thorough knowledge of this branch of the science of numbers much more easily obtainable.

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BASINS, for Evaporating—

BERLIN PORCELAIN, finest quality, with Spout—

No.	Inch diam.	Price each.	Price per doz.	No.	Inch diam.	Price each.	Price per doz.
00	2¾	*5d*	4/	6	6	2/	21/
0	3	*6d*	4/9	7	7	2/6	27/
1	3¼	*9d*	8/3	8	8½	3/	38/
2	3½	*10d*	9/	9	10	5/	54/
3	4	1/	10/6	10	12	7/6	82/
4	4¼	1/3	13/3	11	14	9/	100/
5	4½	1/8	18/	12	15½	25/	280/

MEISSEN (Dresden) Porcelain, with Spout, shallow and very thin—

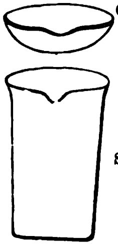
In. diam.	2½	3½	4½	5	5½	6½	7½	8½	10	11	12in. diam.
Price	*4d*	*5d*	*8d*	*10d*	1/3	1/2	2/4	3/	4/6	5/	6/6 each.

GERMAN Porcelain, with Spout, glazed inside (*a cheap basin for ordinary use*)—

No.	Inch diam.	Price each.	Price per doz.	No.	Inch diam.	Price each.	Price per doz.
1	2½	*3d*	2/6	6	5	*7d*	6/
2	3	*4d*	3/3	7	5½	*9d*	8/
3	3½	*4d*	3/6	8	6	1/	10/
4	4	*5d*	4/3	9	6½	1/3	12/
5	4½	*6d*	5/				

Extracts from M. Jackson & Co.'s Price List.

BEAKERS, for Hot Solutions, finest Bohemian Hard Glass, and of the best make—



No.	Ozs. cap.	Inch deep.	Price each.	Price doz.	No.	Ozs. cap.	Inch deep.	Price each.	Price doz.
00	1	1¾	2*d*	1/9	6	23	5½	9*d*	8/
0	1½	2	3*d*	2/9	7	32	6	10*d*	9/
1	3½	2½	4*d*	3/6	8	48	7½	1/	13/
2	4½	3	5*d*	4/6	9	67	8½	1/3	13/6
3	7	3½	6*d*	5/6	10	90	9	1/6	15/6
4	10	4	7*d*	6/3	11	120	10	1/8	17/
5	16	4½	8*d*	7/3	12	154	11	1/10	19/

BEAKERS, similar to the above, nested—

Sets of	Nos.	Price per set.	Sets of	Nos.	Price per set.
3	00 to 1	7*d*	5	1 to 5	2/-
3	0 „ 2	10*d*	5	2 „ 6	2/6
3	1 „ 3	1/-	5	3 „ 7	3/-
3	2 „ 4	1/2	6	0 „ 5	2/3
3	3 „ 5	1/6	8	1 „ 8	4/6
4	1 „ 4	1/4	10	1 „ 10	7/-
4	5 „ 8	3/-	12	1 „ 12	9/6
5	0 „ 4	1/8			

Do. with SPOUTS, same quality as above, but short and wide—

ozs. cap.	3	5	8	12	20	25	40	ozs. cap.
price	4*d*	5*d*	6*d*	8*d*	10*d*	1/	1/2	each.

Similar to the above, nested—

Set of 4, cap. 5 to 20 ozs.	...	0	2	0
„ 5 „ 5 „ 25 „	...	0	3	0
„ 6 „ 5 „ 40 „	...	0	4	0

BOTTLES—

BOHEMIAN WHITE GLASS, stoppered—

ozs. cap.	½	1	2	4	6	8	12	16	20	40	ozs.
price N.M.	1/6	1/8	1/10	2/3	2/8	3/	3/6	4/	4/6	5/6	per doz.
„ W.M.	1/8	2/3	2/8	3/	3/8	4/	4/6	5/3	5/9	7/	„

BOTTLES for CORKS, White French Glass, Narrow Mouth—

ozs.	1	2	3	4	5	6	8	10	ozs.
price	7*d*	9*d*	10*d*	1/	1/1	1/3	1/6	1/9	per doz.

BOTTLES for CORKS, White French Glass, Wide Mouth—

ozs.	1	2	4	5	8	10	12	ozs.
price	8*d*	10*d*	1/1	1/2	1/8	2/	2/6	per doz.

FRENCH WHITE GLASS, accurately stoppered.

ozs.	½	1	2	3	4	6	8	10	12	16	20	ozs.
price N.M.	1/10	2/	2/6	2/9	3/	3/9	5/	5/9	6/6	7/6	8/6	per doz
„ W.M.	2/9	3/	3/6	4/	4/9	6/6	7/6	8/6	9/6	11/	13/	„

BURETTES—

MOHR'S, with India-rubber Tube and Glass Jet—

CC.		Divs.	Price each.	Grains.	Divs.	Price each.
20	in	200	1/10	200	200	1/8
25	„	250	2/	500	100	2/8
30	„	300	2/4	1,000	100	3/6
50	„	250	2/10	1,000	200	4/0
50	„	500	3/2			

Clips for the above, 4*d* each extra.

MOHR'S, with Glass Stopcock—

50 cc. in 250 divs. 5/, 50 cc. in 500 divs. ...		0	5	6
1,000 grains in 100 divs. 5/6, 1,000 grains in 200 divs. ...		0	6	0
ERDMAN'S FLOATS ...	each	0	0	9

Extracts from M. Jackson & Co.'s Price List.

BURETTE STANDS—

	£	s.	d.
Teakwood for one 2/, for two	0	2	6
Mahogany do. for one 4/6, for two	0	6	6
Do., with Brass Rod and Screw Clip, Dr. Percy's...	0	7	6

CORK BORERS—

Sets of	2	3	4	6	9	12
Price	10*d*	1/	1/6	2/6	4/6	6/ per set.

CRUCIBLES AND COVERS—

MEISSEN (Dresden) Porcelain—

Nos.	Ozs. cap.	Price each.	Price per doz.	Nos.	Ozs. cap.	Price each.	Price per doz.
9	⅛	4*d*	3/9	4	2½	10*d*	9/
8	¼	5*d*	4/6	3	3½	2/	10/6
7	¾	6*d*	5/6	2	5	1/2	12/6
6	1	7*d*	6/6	1	1	1/6	16/
5	1¼	8*d*	7/				

DRYING APPARATUS—

	£	s.	d.
HOT AIR OVENS, round, TAYLOR'S, japanned tin, with moveable legs	0	14	0

HOT AIR OVENS, square, Copper—

Inches square	6	7	8	9	10 inches square.
Price	18/	21/	24/	30/	33/ each.

FILTER PAPER—

		£	s.	d.
DUTCH, very thick and coarse	per quire	0	2	6
ENGLISH, best white	„	0	1	0
Do. do. larger sheets	„	0	1	9
RHENISH, nearly equal in quality to Swedish ...	„	0	2	0
SWEDISH, Munktell's genuine	„	0	4	0

FILTERS, CUT (Circular), in packets of 100—

In. diam.	2¼	2¾	3½	4½	5½	7½ in. diam.
ENGLISH	2*d*	4*d*	5*d*	6*d*	9*d*	1/ per packet.
RHENISH	3*d*	4*d*	8*d*	9*d*	1/	1/6 „
SWEDISH	4*d*	5*d*	10*d*	1/2	1/9	2/3 „

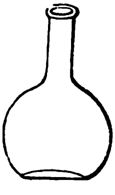
FRENCH—

In. diam.	6	8	10	13	16	20 in. diam.
Price	8*d*	10*d*	1/	1/6	2/	2/6 per packet.

FILTER STANDS, White Hard Wood

		£	s.	d.
FILTER STANDS, White Hard Wood	each	0	1	0
Do. Black, for one 1/2 ; for two filters ...	„	0	2	0
Do. Teak Wood, for one 2/ ; for two ...	„	0	2	6

FLASKS, finest BOHEMIAN Hard Glass, for boiling—



Ozs. cap.	Price each.	Price per doz.	Ozs. cap.	Price each.	Price per doz.
1	3*d*	2/9	24	10*d*	9/
2	3*d*	3/	32	11*d*	10/
4	4*d*	3/9	48	1/1	11/6
6	5*d*	4/6	64	1/2	12/6
8	6*d*	5/6	100	1/6	16/
12	7*d*	6/6	160	2/	21/6
16	8*d*	7/3	240	3/	—
20	9*d*	8/	320	4/	—

GERMAN—

ozs.	2	4	8	12	16	24	32 ozs. cap.
Price	2/	2/3	3/	4/	5/	6/	7/ per doz.

GAUGED and marked in neck, Grains—

To contain	500	1,000	5,000	10,000 grains.
Price, plain	9*d*	1/	1/6	1/9 each.
Price, stoppered		1/3	1/9	2/ „

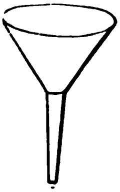
Extracts from M. Jackson & Co.'s Price List.

Do., Cubic Centimetres—

To contain	5	10	25	50	100	250	500	1,000	cc.
Price, plain	3*d*	4*d*	6*d*	7*d*	9*d*	1/2	1/4	1/9	each.
Price, stoppered	—	—	8*d*	9*d*	1/2	1/9	2/	2/6	„

FUNNELS—

BOHEMIAN GLASS, plain or ribbed, ground edges—



Inch diam.	Price each.	Price per doz.	Inch diam.	Price each.	Price per doz.
1	3*d*	2/6	5	11*d*	10/
1½	3*d*	2/9	6	1/2	13/
2	4*d*	3/9	7	1/6	16/6
2½	5*d*	4/6	8	2/	22/
3	6*d*	5/6	9	2/6	27/
3½	7*d*	6/3	10	3/0	34/
4	8*d*	7/			

ENGLISH GLASS, plain or ribbed—

in. diam	1	1½	2	2½	3	4	5	6	in. diam.
price	1/6	1/9	2/	2/6	3/	4/	6/	9/	per doz.

THISTLE-HEAD—

in. long	8	12	15	18	in. long.
price	2*d*	3*d*	4*d*	4*d*	each.
price doz.	1/4	2/4	3/4	3/4	per doz.

GRADUATED MEASURES, Glass—

	1	2 drm.	½	1	2	4	6	8	10	16	20	40	ozs.
price	9*d*	1/	8*d*	9*d*	1/	1/3	1/6	1/9	2/	2/3	2/6	4/	each.

GRADUATED TEST MIXERS, stoppered, in 100 divs.—

litre	¼	½	1	grains	1,000	5,000	10,000	grains.
price	3/6	4/6	6/6		2/6	4/	5/	each.

GRADUATED TUBES, on foot, in 100 divs.—

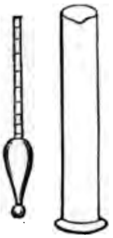
cc	25	50	100	200	250	500	1,000	cc.
price	1/2	1/6	1/9	2/3	2/6	3/6	5/6	each.

Do. Graduated in Grains—

grains	100	200	250	500	1,000	5,000	10,000	grains.
price	8*d*	1/	1/2	1/6	2/	3/	4/	each.

GRADUATED TUBES for showing the per centage of Cream in Milk ... each	0	1	0
Stand for 4 Tubes ...	0	1	6

HYDROMETERS, &c.—

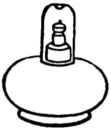


Ammoniometer, with Ivory Scale ...	0	3	0
Argentometer, with Immersion Tube ... and	0	2	6
Beaumé's ... and	0	2	6
Cartier's ...	0	2	0
Lactometer. complete 1/6 and 2/3; Ivory Scale ...	0	3	0
Oleometer, Ivory Scale ...	0	3	0
Saccharometer, 2/6; Ivory Scale ...	0	3	0
Do., Beaumé's ...	0	1	6
Salinometer, for Aquarium, 1/6; for Sea Water ...	0	2	0
Sikes', with Weights, Thermometer and Tables, complete	3	3	0
Specific Gravity, for Acids, &c., 1,000—1,850 ...	0	2	6
Do., for Spirits, 700—1,000 ...	0	2	6
Do., for Spirits from 40° under to 60° over proof, 2/6; Ivory Scale ...	0	3	0
Do., for closer determinations, marked at every two degrees:—700—1,000, 1,000—1,300, 1,300—1,600, 1,600—1,900 each ...	0	3	0
Do., for Light Oils, 600—650, 650—700, 700—750, 750—800, 800—850, 8 0—900, 900—950, 950—1,000, in single degrees ... each	0	2	0
TWADDEL'S, Nos. 1 to 6, each 1/6 ... per doz.	0	15	0
Urinometer, Ivory Scale, in Leather Case ...	0	3	0
Do., with graduated Trial Jar in ditto ...	0	4	6

Extracts from M. Jackson & Co.'s Price List.

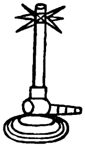
HYDROMETER IMMERSION TUBES—

inch high	6	8	10	12	14	inch high.
price	8*d*	10*d*	1/	1/3	1/6	each.
per doz.	7/6	9/	11/	13/6	16/	per doz.



LAMPS—

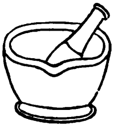
BERZELIUS, Brass, on Stand, with Rings, &c. ...	1	0	0
GAS, Bunsen's ... ... 1/3, 2/3, and	0	3	6
Rose, for ditto ... ... 1/, 1/3, 1/9, and	0	2	0
Star Support for do., with Chimney, 6*d*, 8*d* and	0	0	10
GAS, Bunsen's, with two tubes on one stand ...	0	3	6
Do. three tubes, 4/6; Do, four tubes... ...	0	5	6



SPIRIT, GLASS, with Stoneware or Brass Tube Wick Holder—

ozs. cap.	1	2	4	8	ozs. cap.
price	9*d*	10*d*	1/	1/3	each
with Brass Cap do.	1/	1/	1/3	1/9	„
with Screw Cap do.	1/3	1/6	1/9	2/	„

SPIRIT, TIN, Argand with hot Plate, Rings for Dishes, and Tripod Support, complete ...	0	3	0
Do., Copper	0	5	0



MORTARS and PESTLES.

BERLIN SEMI-PORCELAIN—

Inch diam.	2	2½	3½	4	5 inch diam.
Price	5*d*	7*d*	10*d*	1/3	1/9 each.

IRON, Bell shape—

In. diam.	4	4½	5½	6½	8	10	12 in. diam.
Price	1/6	2/3	3/6	4/6	6/	10/	17/ each.

NESSLERS' TEST GLASSES, marked ... ... each	0	1	6
PIPETTES, Bulb, 2*d*, 3*d*, and 4*d*; per doz., 1/6, 2/, and	0	2	6
Cylindrical, 3*d*, 4*d*, and 6*d*; per doz., 2/6, 3/, and	0	4	0

GAUGED to deliver—

Grains	10	20	50	100	500	1,000 grains.
Price	4*d*	5*d*	6*d*	8*d*	10*d*	1/3 each.
Per doz.	3/6	4/3	5/	7/	9/	12/6 per doz.

Cubic Centimetres—

cc.	1	5	10	20	25	50	100 cc.
Price	4*d*	5*d*	6*d*	8*d*	9*d*	1/	1/3 each.
Per doz.	3/6	4/6	5/3	7/	8/	10/	13/ per doz.

PNEUMATIC TROUGHS, Stoneware, circular, 11 by 5 inch ...	0	2	3
Bee-hive Shelf for do.	0	0	9

PNEUMATIC TROUGHS, Japanned Tin—

Galls. cap.	1	2	4	6	galls. cap.
Price	2/6	3/	5/	8/	each.

Do. with Side Shelves—

Length.	Width.	Depth.	Price.
17	12	7½	8/6
21	12	7½	10/6
21	14	8½	12/6

Do for Mercury, Porcelain, 4lbs., 2/; 10lbs.	0	3	0

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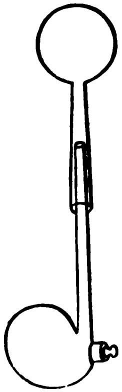


RECEIVERS, finest BOHEMIAN Hard Glass, Plain or stoppered, same price as Retorts.

Do., with two or three Necks—

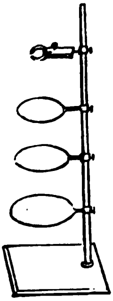
ozs.	4	8	16	32 ozs.
Price, 2 necks	9*d*	1/	1/6	2/
„ 3 necks	1/	1/4	2/	2/6

RETORTS, finest Bohemian Hard Glass—

Ozs.	Plain.		Tubulated.		Stoppered.	
cap.	Each.	Per doz.	Each.	Per doz.	Each.	Per doz.
2	3*d*	2/9	4*d*	3/9	9*d*	8/6
4	4*d*	3/9	5*d*	4/10	10*d*	9/6
8	5*d*	4/6	6*d*	6/	1/	11/
12	6*d*	5/9	7*d*	6/6	1/1	12/
16	7*d*	6/6	8*d*	7/3	1/2	13/
24	8*d*	7/6	9*d*	8/	1/4	14/6
32	9*d*	8/	10*d*	9/	1/6	16/
48	1/	10/6	1/3	13/6	2/3	24/
64	1/3	13/	1/6	16/	2/6	26/
100	1/6	16/	2/	21/	3/3	33/

Tubulated for MANUFACTURING PURPOSES—

lbs. cap.	1	10	14	18	24	36	48 lbs. cap.
Price	2/3	2/9	3/	3/6	4/6	5/6	8/ each.



RETORT STANDS, IRON, with three Brass Rings—

Length of Rod, inch	13	15	17	20	24 inch.
Price	1/	2/6	3/6	4/6	8/ each.

GALVANIZED Iron, with three Rings—

Length of Rod, inch	16	20	24	30 inch.
Price	4/6	6/	12/6	16/6 each.

RETORT STAND CLAMPS, Spring, for the smaller stands ... ... each 1/, 1/6, and	0	2	0
Do. Screw, for the larger stands ... 3/6 and	0	4	0
Do., STOCKHARDT'S, White Wood, 2/6, extra joint	0	3	6

SAND-BATH DISHES, Iron—

Inch	4	5	6	8	10	12 inch.
Price	4*d*	4*d*	5*d*	7*d*	10*d*	1/ each.

SPATULAS, best Steel—

Inch	3	4	5	6	7 inch blade.
Price	7*d*	8*d*	10*d*	1/	1/3 each.

Bone, 1/, Ivory, 2/6, Platinum, at per oz.	1	12	0

SPECIFIC GRAVITY BOTTLES, in Tin Case, with Counterpoise—

Grains	250	500	1,000 grains.
Price	4/6	4/6	5/ each.

STILLS, Copper or Tin, with pure Tin Worm Condensers—

	1 pt.	1 qt.	6	1	2	4 galls.
Copper	11/6	15/	21/	30/	45/	80/ each.
Tin	7/6	10/	12/6	15/	25/	35/ each.

PHILLIPS' Revenue Standard, accurately made, as supplied to the Laboratories of Her Majesty's Customs	3	10	0
SULPHURETTED HYDROGEN APPARATUS, small	0	1	0
Do., on stand, with Wash Bottle...	0	3	6
Do.. Babo's, on stand complete	0	5	6
Do., as Fig. 42, Valentin's Inorganic Chemistry	0	10	6
Do., Kipp's German Glass ... ... 7/6, 10/, and	0	12	0
Do., do., Bohemian Glass, large size	1	1	0

Extracts from M. Jackson & Co.'s Price List.

TEST GLASSES—

CLARK'S. Ozs. cap.	Price each.	Price per doz.	CYLINDRICAL. Ozs. cap.	Price each.	Price Per doz.
1	3*d*	2/9	2	6*d*	5/9
2	4*d*	3/6	4	8*d*	7/6
3	5*d*	4/4	6	10*d*	9/3
4	6*d*	5/4	8	1/	11/

TEST TUBES, finest German Glass—

Size Inches.	Price Per doz.	Price Per gross.	Size Inches.	Price Per doz.	Price Per gross.
2 × ¼	3*d*	2/9	5 × ¾	9*d*	8/3
3 × ⁵⁄₁₆	4*d*	3/3	6 × ⅝	10*d*	9/3
3 × ⅜	5*d*	4/3	6 × ¾	11*d*	10/
4 × ½	6*d*	5/3	6 × 1	1/2	12/6
4 × ⅝	7*d*	7/	7 × 1¼	1/6	16/
5 × ½	8*d*	7/3	8 × 1½	2/	21/
5 × ⅝	8*d*	7/3	10 × 2	3/6	38/

THERMOMETERS—

Box Wood Scale, 1/ and 1/6; jointed to 300° F.	0	3	6
For Baths, Japanned Tin Scale	0	1	0

Chemical, to pass through Corks, with Paper or Milk Glass Scale enclosed in Glass Tube, or graduated on stem—

	400°F.	600°F.	300°C.	
Paper Scale	2/6	3/	3/	price each.
Milk Scale	3/6	4/	4/	"
Grad. on stem with enamelled back	5/	6/	5/6	"

TUBING—

SOFT GLASS, for bending, all sizes, per lb.	0	1	0
Do., HARD GLASS, for combustions, finest Bohemian, per lb. ...	0	1	4

INDIA RUBBER, Grey—

inside diam.	⅛	³⁄₁₆	¼	⅜	½	⅝	¾	1	in. diam.
price	3*d*	4*d*	5*d*	7*d*	9*d*	1/	1/4	2/2	per foot.

Black, 1*d* per foot extra.

Do. thick, for pressure ⅛ inch internal diam. and ⅜ inch external diam., per foot	0	2	0

WATER BATHS—

BERLIN PORCELAIN, 3 ozs. 3/; 4½ ozs. 3/6; 6 ozs.	0	5	0
WEDGWOOD Pearlware, 3 ozs. 1/3, 4 ozs.	0	1	6
COPPER, with 4 Rings for Basins, 30 ozs. 8/, 60 ozs.	0	10	6
Do. with 6 rings, stopcock and gauge 2 galls. cap.	1	15	0

WOULFFE'S BOTTLES—

Ozs. cap.	Price each. 2 necks.	Price each. 3 necks.	Ozs. cap.	Price each. 2 necks.	Price each. 3 necks.
5	9*d*	1/-	64	2/6	3/
8	1/	1/3	100	4/	4/6
16	1/3	1/6	130	5/6	6/
32	1/9	2/	160	6/3	7/3
48	2/3	2/6	320	10/	12/

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